2018

Assessing the Suitability of the Division Exercise Training and Review System (DXTRS) to Support Sustainment Training

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ASSESSING THE SUITABILITY OF THE DIVISION EXERCISE TRAINING AND REVIEW SYSTEM (DXTRS) TO SUPPORT SUSTAINMENT TRAINING

by

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A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Science
in the Department of Industrial Engineering and Management Systems
in the College of Engineering and Computer Science
at the University of Central Florida
Orlando, Florida

Fall Term
2018

ABSTRACT

The military has used simulations to train Soldiers for several decades. Army Commanders use live, virtual and constructive training to prepare troops for combat and to improve their Military Occupational Specialty (MOS) skillset. During training and other military operations, the Army Battle Command Systems (ABCS) provide Army commanders with a Common Operational Picture (COP) which typically includes a real-time status of personnel, supplies, munitions, and equipment. In 2016, the Combined Arms Support Command (CASCOM) divested the Battle Command Sustainment Support System (BCS3) due to data latency issues. The sustainment Warfighting Function (WfF) used BCS3 as a dual-purpose system for real world operations and constructive simulation training events. The same year, the Army also streamlined its Joint Land Component Constructive Training Capability (JLCCTC) to reduce costs further limiting the usefulness of JLCCTC to train sustainment units. This study considers the suitability of the Division Exercise Training and Review System (DXTRS) to fill the sustainment training gap. A combination of face to face and telephonic interviews are conducted with Soldiers and select Department of Defense (DoD) contractors to determine the appropriateness of DXTRS for sustainment training. Interview questions designed using the Technology Acceptance Model (TAM) are used to measure DXTRS version 1.06 suitability as a sustainment training tool. Inductive thematic content analysis is used to analyze the interview transcripts and provide findings, conclusions, and recommend future research.

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A	Attitude Toward Using
ABCS	Army Battle Command System
ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
AFATDS	Advanced Field Artillery Tactical Data System
ALOTT	Army Low Overhead Training Toolkit
AMDWS	Air and Missile Defense Workstation
ARI	Army Research Institute
AUTL	Army Universal Task List
BCS3	Battle Command Sustainment Support System
BFT	Blue Force Tracker
BN	Battalion
BI	Behavioral Intention to use
BDE	Brigade
BSB	Brigade Support Battalion
C2	Command and Control
C4I	Command, Control, Communications, Computers and Intelligence
CAC	Combined Arms Center
CAC	Common Access Card
CASCOM	Combined Arms Support Command
CAQDAS	Computer Assisted Qualitative Data Analysis Software
CATS	Combined Arms Training Strategy
CGSC	Command and General Staff College
COP	Common Operational Picture
CP CE	Command Post Computing Environment
COCOM	Combatant Command
COSCOM	Corps Support Command
CPOF	Command Post of the Future
CPX-F	Command Post Exercise-Functional
CSSB	Combat Sustainment Support Battalion
CSSCS	Combat Service Support Control System
DA	Department of the Army
DP	Dual Purpose
DBL	Distribution Based Logistics

DDS	Data Distribution Service
DoD	Department of Defense
DXTRS	Division Exercise Training and Review System
E	Perceived Ease of Use
EAB	Echelons Above Brigade
ERF	Entity Resolution Federation
ESC	Expeditionary Sustainment Command
EXEVAL	External Evaluation
FSC	Field Service Company
GCCS-A	Global Command Control System-Army
IRB	Institutional Review Board
JBCP	Joint Battle Command Platform
JBMDL	Joint Base McGuire Dix Lakehurst
JCATS	Joint Conflict and Tactical Simulation
JCR	Joint Capabilities Release
JDLM	Joint Deployment Logistics Model
JLCCTC	Joint Land Component Constructive Training Capability
LESD	Logistics Exercise and Simulation Directorate
LVC-G	Live, Virtual, Constructive and Gaming
LLNL	Lawrence Livermore National Laboratory
LMS	Learning Management System
LOGFED	Logistics Federation
MC	Mission Command
M-COP	Materiel Common Operational Picture
MCTP	Mission Command Training Program
MTC	Mission Training Center
MDMP	Military Decision Making Process
METL	Mission Essential Task List
MOE	Measures of Effectiveness
MOP	Measures of Performance
MOS	Military Occupational Specialty
MRF	Multi-Resolution Federation
MRQ	Multiple Resources Questionnaire
MTS	Movement Tracking System
NASA TLX	National Aeronautics and Space Administration Task Load Index
NASA-TLX	National Aeronautics and Space Administration -Task Load Index
OC/T	Observer Controller/Trainer

OIF	Operation Iraqi Freedom
ONESAF	One-Semi-Automated Force
OPSEC	Operations Security
PBUSE	Property Book Unit Supply Enhanced
PEO-STRI	Program Executive Office for Simulation, Training and Instrumentation
PM	Program Manager
PU	Perceived Usefulness
RPAR	Research Protection Administrative Review
RTLX	Raw-TLX
STAFFEX	Staff Exercise
SIMOPS NET	Simulations Operations Network
SUST BDE	Sustainment Brigade
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model Version 2
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Behavior

CHAPTER ONE: INTRODUCTION TO ARMY SUSTAINMENT TRAINING

Technology is infused into nearly every aspect of military operations and has significantly enhanced how the military trains and operates (Fletcher & Chatelier, 2000; Vergun, 2014). Army organizations use various training methods to prepare for combat, whether it is conducting a live fire range to improve marksmanship or gaming to improve the performance of Army medics or close combat tactics (Proctor & Woodman, 2007; Sotomayor & Proctor, 2009).

The military has used simulations to train Soldiers for several decades. Those training methods are typically a mixture of live, virtual, constructive and gaming (LVC-G) as well as training systems embedded into operational equipment (dual purpose systems) (LVC-G&DP). As early as 2004, the Army began using Warfighter Simulation (WARSIM) to train Soldiers (Hanlon, 2005). WARSIM is a constructive simulation capability that interfaces with other live, virtual, and constructive training simulations to provide a more realistic representation of the modern battlefield (Payne & Dietrick, 2005). It can also distribute to remote sites and interoperate with organic unit Command, Control, Communications, Computer and Intelligence (C4I) equipment to offer a comprehensive training and mission rehearsal capability. WARSIM immediately transformed how commanders prepared their units for combat using computer-based simulation (Payne & Dietrick, 2005). In 2007, the Army invested in a comprehensive live, virtual and constructive simulation training program called Warfighter Focus (Goure, 2015). Currently, Warfighter exercises are major training events that are evaluated by the Mission Command Training Program (MCTP). MCTP is an organization at Fort Leavenworth, Kansas

that trains and evaluates deploying units through a comprehensive exercise called “Warfighter” that incorporates WARSIM (Department of the Army, 2014). WARSIM easily interfaces with other simulations such as the Logistics Federation (LOGFED) (Payne & Dietrick, 2005). LOGFED uses the Joint Deployment Logistics Model (JDLM) software to provide constructive logistics simulation capability (LESD, 2005).

The term sustainment must be defined to accurately assess the appropriateness of simulation as a training tool. The Army Doctrine Publication (ADP) 4-0, *Sustainment*, defines sustainment as “the provision of logistics, personnel services, and health service support necessary to maintain operations” (Army , 2012). The Army sustains operations at the strategic, operational and tactical levels (Army, 2017). Table one outlines the three levels of sustainment operations as defined in the TRADOC Pamphlet 525-4-1 (Army, 2017) and the corresponding systems used for training. The systems identified in red font are the previous systems that were used to support sustainment training. Sustainment, as stated by the Army, is adequate for this study and will be discussed in context with the ability of simulation to help Soldiers train to meet sustainment functions.

Table 1: Army Sustainment Operations

Army Battlefield Level	Level Description	Echelon/Unit Supported	Headquarters Responsible for Sustainment Support	Current & Recent Past Corresponding Supporting Training Systems
Strategic	"Integrate joint, inter-organizational, and multinational partners to build capability."	COCOM Joint Force Commander	Theater Sustainment Command (TSC)	BCS3 (MRF) JDLM (MRF)
Operational	"Support to and assist with force deployment and sustain operations to enable freedom of action and operational reach across multiple theaters."	Division Corps	Sustainment Brigade (SUST BDE) Expeditionary Sustainment Brigade (ESC)	WARSIM (MRF) JCATS (ERF) JDLM (MRF) BCS3 (MRF) DXTRS
Tactical	"Deliver supplies and services to the warfighter to enable cross-domain maneuver and prolong endurance."	Brigade Battalion Company	Brigade Support Battalion (BSB) Field Service Company (FSC)	JCATS (ERF) WARSIM (MRF) WARSIM-B (MRF) DXTRS JDLM (MRF) BCS3 (MRF)

Source: Army, 2017; CASCOM , 2014.

To better prepare sustainment units for deployment, Combined Arms Support Command (CASCOM) created the command post exercise functional (CPX-F) (Sickles, 2017). CASCOM is "the Army organization responsible for training and educating sustainment personnel and integrating Army and Joint sustainment capabilities to prepare the Army to sustain Unified Land Operations (ULO)" (CASCOM, 2015). It is also the sustainment force modernization proponency and integrates and synchronizes sustainment capabilities and requirements for the Army (CASCOM, 2015). The CPX-F focuses on home-station mission command training for Echelons Above Brigade (EAB) sustainment organizations in preparation for an external evaluation (EXEVAL) training event such as the Warfighter Exercise (WFX) (Sickles, 2017).

EAB Units are units such as the Combat Sustainment Support Battalion (CSSB) of the Sustainment Brigade (SUST BDE) and the Expeditionary Sustainment Command (ESC) that are located at echelons above the brigade level. JDLM provide units with scalable and tailorable information that matches sustainment information systems (Sickles, 2017). Constructive training simulations such as WARSIM, the Joint Conflict and Tactical Simulation (JCATS) have been used for collective training for units from Battalion to Echelons Above Corps (Logistics Exercise and Simulation Directorate, 2005). Training enables organizations to execute tasks in various conditions and situations to better prepare for combat.

Training of personnel and units providing logistic sustainment of warfighters is a situation where outcomes of LVC-G&DP have been less than desired. Specifically, in 2005 the United States Government Accountability Office determined that the Department of Defense logistic distribution system was unable to provide adequate sustainment support to warfighters (United States Government Accountability Office, 2005). Subsequently, the Army sought to improve logistics distribution system and asset visibility across all levels resulting in the U.S. Army fielding BCS3 (Sachariason, 2009). During training and other military operations, the Army Battle Command Systems (ABCS) are used to provide Army commanders with a Common Operational Picture (COP) which typically includes a real-time status of personnel and equipment. Each Warfighting Function (WfF) within the Army has a system that provides a COP for their WfF. For example, the Field Artillery uses the Advanced Field Artillery Tactical Data System (AFATDS) and the Air Defense Artillery uses the Air and Missile Defense Workstation (AMDWS). The sustainment WfF used the BCS3 as a dual-purpose system that addressed ABCS and also supported constructive simulation training events. BCS3 was populated by JDLM during constructive simulation training exercises (Logistics Exercise and Simulation Directorate,

2005). Over time, soldiers and commanders grew frustrated with BCS3 data latency issues and lost trust in BCS3's ability to provide "real-time" sustainment data (Combined Arms Support Command, 2016). In 2016, CASCOM got rid of BCS3 due to data latency issues (Dorsey, 2016). The 2016 divestment of BCS3 by the Army left a void for a sustainment mission command system and a training support system that provides real-time sustainment data (Dorsey, 2016). Additionally, the US Army streamlined its Joint Land Component Constructive Training Capability (JLCCTC) to reduce costs throughout the JLCCTC. The streamline included downsizing from the Entity (ERF) and Multi (MRF) Resolution Federations to one federation (United States Army Combined Arms Center, 2015). The MRF remains in service in the JLCCTC (United States Army Combined Arms Center, 2015). With the downsizing, some constructive training capabilities are no longer accessible via the JLCCTC ERF. One such program downsized includes JCATS. JCATS is the mostly widely used simulation in the world (LLNL, 2017). It is an effects based ground maneuver constructive simulation. It was used as a lower cost training option to WARSIM and was capable of federating with other systems such as JDLM to provide additional logistics capability. JCATS was able to integrate with players in a training area and display their location and actions as part of the exercise providing realism as well as an operational picture in real-time (LLNL, 2017). The Joint Staff, J7 use JCATS to support worldwide training events (LLNL, 2017). Because of its flexibility, units were able to conduct multiple iterations of training to achieve their training objectives. To replace JCATS within the Army, in 2016, the Army fielded WARSIM-Brigade and below (WARSIM-B) which helped mitigate the loss of the ERF and JCATS (United States Army Combined Arms Center, 2015). In addition to the loss of JCATS as a training tool, a new sustainment model will soon replace JDLM (LESD, 2017).

In the meantime, in the post BCS3 era, staffs at all echelons use a combination of Microsoft Excel spreadsheets, PowerPoint, and JDLM during training exercises and real-world operations to track their personnel and equipment (Combined Arms Support Command, 2016). The disjointed solutions provide the commander with the information required to make decisions but require a significant effort to accomplish tasks once accomplished by one system. Further, there is no currently fielded dual-purpose system that supports the sustainment WfF operations and training. For effective training, soldiers should not use multiple manual solutions to communicate and track sustainment data.

In preparation for major training exercises such as Warfighter and Ulchi Freedom Guardian (UFG), Army units conduct home station training using low overhead constructive simulations like the Division Exercise Training and Review System (DXTRS). DXTRS is a constructive simulation tool of the Army Low Overhead Training Toolkit (ALOTT) (CAC, 2018). DXTRS is often used to help train staff officers on the Military Decision-Making Process (MDMP) during major combat operations (CAC, 2018). DXTRS was explicitly fielded to bridge the training simulation gap between large-scale JLCCTC exercises and local non-simulation supported unit exercises (CAC, 2018). DXTRS stimulates the Joint Capabilities Release (JCR), Joint Battle Command Platform (JBCP), and Command Post of the Future (CPOF). DXTRS was recently introduced to the operational domain for use as a standalone training tool for active and reserve component units (CAC, 2018). Due to this unique transition from supporting to standalone role, DXTRS is still relatively new to the operational force. Appendix C graphically depicts the known locations of active and reserve component Army units that use DXTRS for training. DXTRS simulates some sustainment capability however it is not as robust as JDLM. Appendix A outlines the current sustainment capabilities of DXTRS version 1.06. Recently, DXTRS was

used in the ERF in conjunction with JDLM to train Army Reserve sustainment units. Though, DXTRS was originally designed for use as a standalone system, its interoperability with several mission command systems such as JDLM, JCR and CPOF provides enough functionality to support sustainment training. Figure one below illustrates how DXTRS, JDLM and CPOF interoperates within the ERF environment.

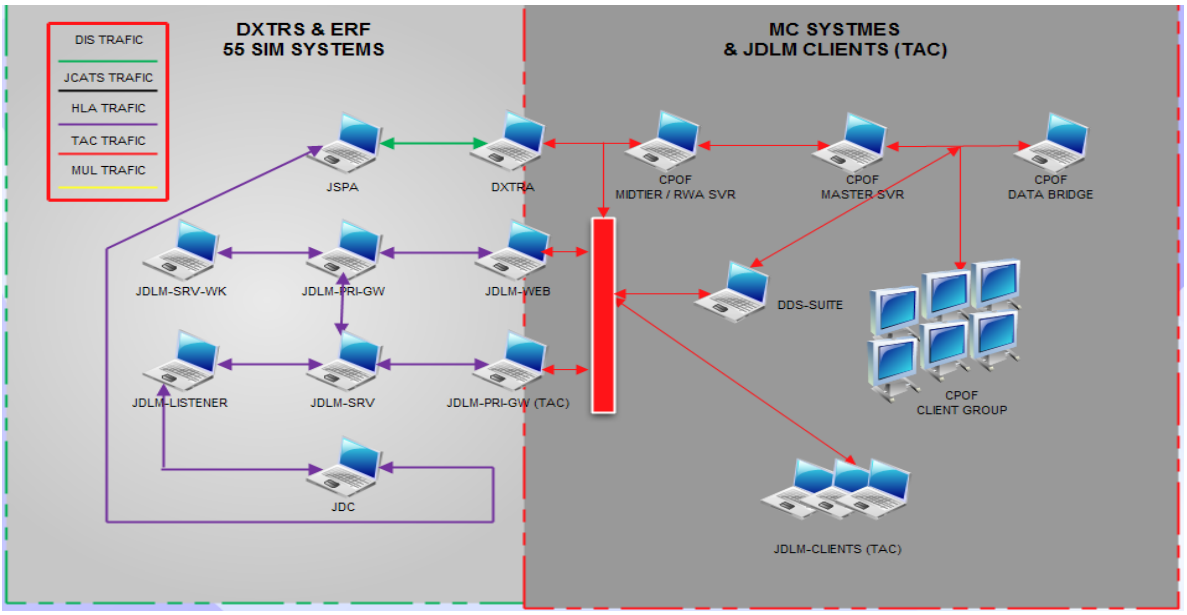


Figure 1. ERF 55 DXTRS, JDLM to CPOF Data Flow

Source: Houston MTC, 84th Training Command, 2018.

Given the current lack of a sustainment mission command system, the question arises, is DXTRS suitable to help maintain sustainment proficiency through training? Secondly, how might one assess the suitability of DXTRS to conduct sustainment training?

CHAPTER TWO: REVIEW OF ASSESSMENT LITERATURE

Suitability as defined by Oxford dictionary is "the quality of having the properties that are right or appropriate for a particular person, purpose or situation" (Oxford University Press, 2018). For this study, suitability is the appropriateness to which a system (DXTRS) meets the needs of the customer (Army personnel responsible for logistics at the Brigade and below level). The suitability of DXTRS as a sustainment training tool is assessed in terms of its measure of performance (MOP) and effectiveness (MOE) in conjunction with the use of the technology acceptance model (TAM) and NASA-TLX.

Assessment of the quality of properties of military simulation systems is often done in the context of operationally validated scenarios, its simulation capabilities, and customer requirements (Garcia & Tolk, 2015). As a result, the assessments tend to focus on the efficiency of the system and in turn measure its effectiveness (MOE) (Garcia & Tolk, 2015). Measures of performance (MOP) assess how well a system operates as it provides the functionality as originally designed (Garcia & Tolk, 2015). A formal assessment of DXTRS in its operational context is required to determine its appropriateness as a sustainment training tool. The assessment should consider the expectations outlined in appendix A, the mission essential tasks and current simulation system capabilities identified in appendix B, and future requirements formally identified by CASCOM.

The TAM developed by Fred Davis may be used to measure suitability dimensions of user's acceptance and use of technology (Chuttur, 2009). The TAM proposes that when users are given new technology their choice to accept and use the technology is influenced by several factors such as the perceived usefulness and perceived ease of use of the technology (Davis, 1985).

Venkatesh and Davis' (1996) TAM presented in figure two, proposes that external variables directly influence perceived usefulness and perceived ease of use. The perceived ease of use impacts the perceived usefulness of a system. It also shows that perceived usefulness and perceived ease of use both impact behavioral intention.

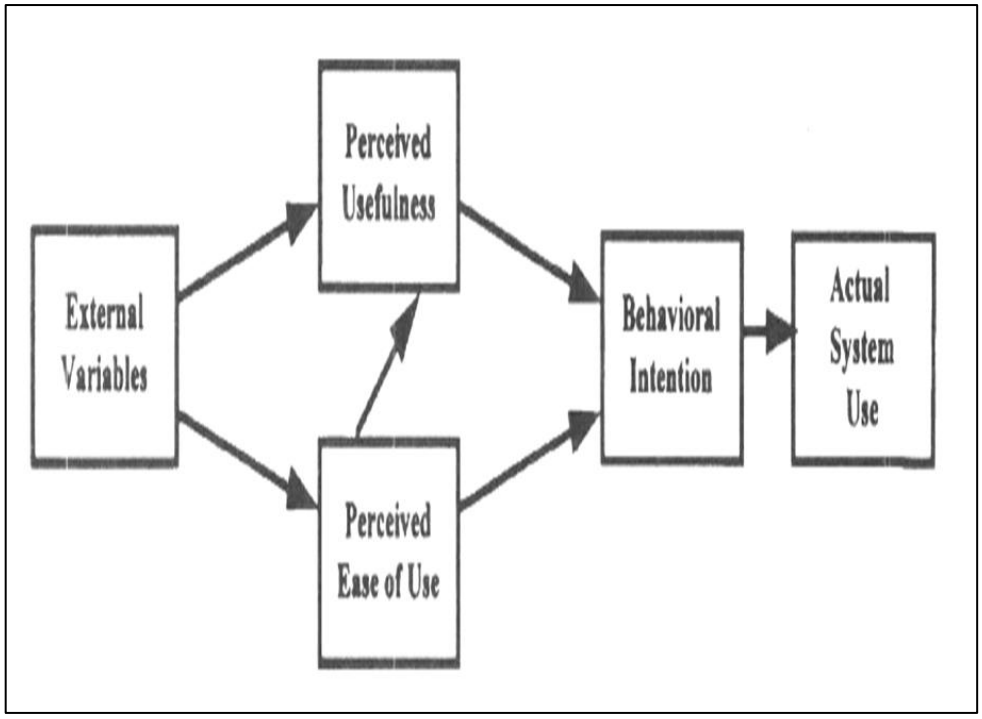


Figure 2. Technology Acceptance Model (TAM)

Source: Venkatesh & Davis, 1996, p.453

Traditional approaches involving the TAM include assessment of new information systems for an organization. Bagozzi, Davis, and Warshaw (1992) introduced the theory of trying to explain the act of learning to use the computer. Their research compared the theory of reasoned action (TRA) and the TAM. They found that inadequate learning inhibits the acceptance of useful systems. Although Bagozzi, Davis, and Warshaw's research successfully identified the importance of the act of learning as an element of technology acceptance and usage it does not

address how useful or suitable a system is to the users. Given the current availability and accessibility of technology, the difficulty of learning a new technology is likely not as challenging as it was in the late 1980s and early 1990s.

Venkatesh and Davis (2000) developed and tested an extension of the technology acceptance model using four longitudinal studies. They expanded upon the original TAM because it did not clearly explain the determinants of perceived usefulness and usage intentions as they relate to social influence and cognitive instrumental processes. Illustrated in figure three below, the TAM2 addresses the perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes.

The TAM2 social and cognitive influence variables used by Venkatesh and Davis (2000)are:

Social Influence Variables

Subjective Norm- addresses whether a system is accepted and used amongst peers and colleagues.

Voluntariness- whether system usage is voluntary or mandated.

Image- the degree to which system usage enhances users standing within their group.

Experience- a user's previous interaction with a system.

Cognitive Instrumental Influence Variables

Job Relevance- the degree to which a system is relevant to the job performance and goals of a potential user.

Output Quality- how well a system performs certain tasks and how well they match the job goals of a user.

Result Demonstrability- system user attributes improved job performance to system usage.

Venkatesh and Davis found that both social influence processes and cognitive instrumental processes influenced user acceptance. The TAM and its variants such as the TAM2 are widely used for research. The UCF library reports over 40,000 scholarly journals that use either the TAM or TAM2. Venkatesh and Davis' TAM2 is relevant to this study because of their expanded variables for perceived usefulness.

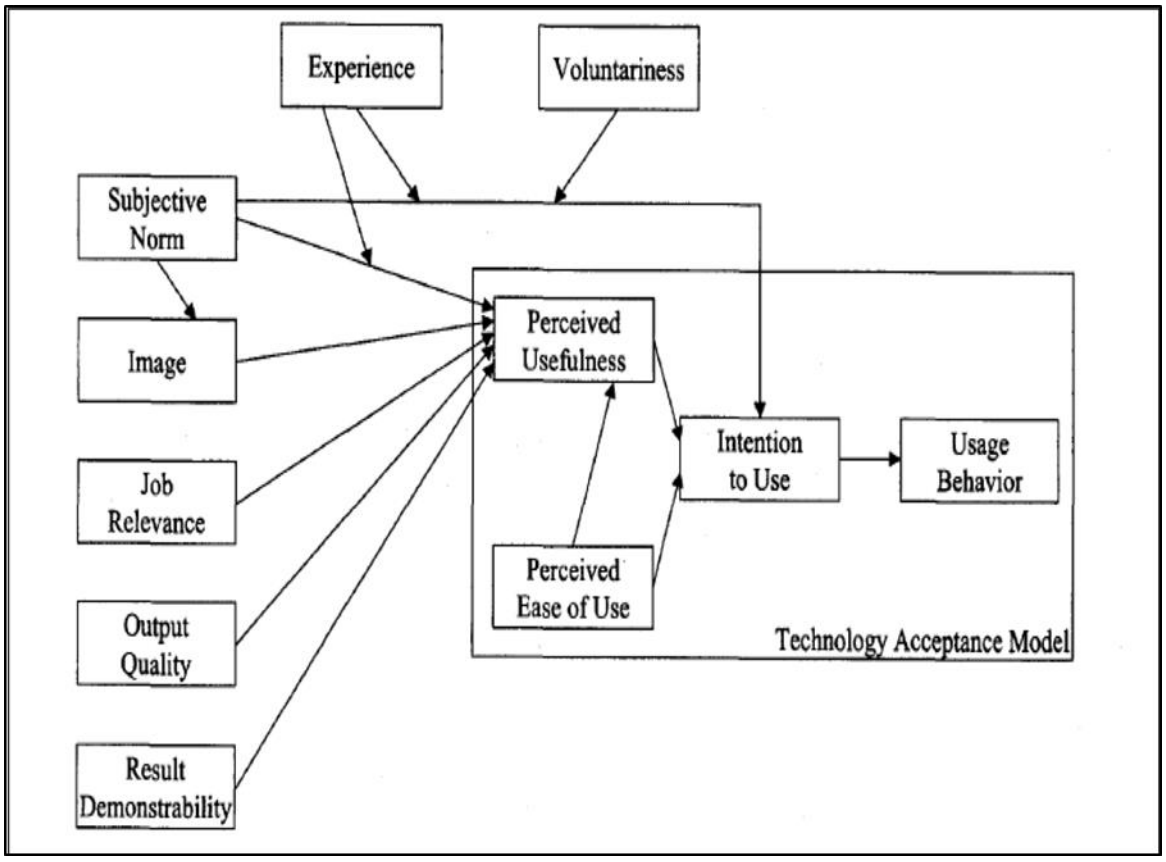


Figure 3. Expanded TAM (V&D)

Source: Venkatesh & Davis, 2000, p.188

Chuttur (2009) thoroughly explains the evolution of the TAM as it descended from the TRA. He believes Ajzen's theory of planned behavior (TPB) is more thorough than the TAM. Though

not as rigorous as the TPB, the TAM is cited more because it is easier to understand. Chuttur also explained that Venkatesh and Davis' TAM2 model focuses on the limitations of the original TAM. Chuttur's historical context of the TAM and alternative theories was informative.

Alharbi and Drew (2014) modified the technology acceptance model to help public universities in Saudi Arabia predict the behavioral intention to use learning management systems (LMS). They presented a framework that includes elements of the TAM as well as additional external variables to address the LMS. Alharbi and Drew's proposed model and TAM implementation closely relates to this study though they used a more traditional TAM approach.

Sachariason (2009) addressed concerns regarding the implementation of BCS3 and its overall acceptance in the Army. He described the importance of battle command systems and linked the Army sustainment transformation to the Army's modular transformation. He explained how JDLM became the backbone of BCS3 due to the failures of the Combat Service Support Control System (CSSCS). Through post-deployment interviews with units returning from OIF, he found that Army units were frustrated with BCS3. He suggested using the TAM before fielding future systems to determine their usability and acceptance from the field. Though Sachariason provided a limited overview of the TAM, he does not show how the TAM could have been used to gauge the usability and suitability of BCS3 in the Army. Though it is not prior to fielding the system, this study expands on Sachariason's suggestion and assess the suitability of DXTRS within the Army.

Hart (2006) provides an overview of the NASA Task Load Index and its various implementations after 20 years of use. She discovered through a google search that NASA-TLX has been cited 82,900 times in numerous languages. She also conducted a google scholar search sing the terms “NASA-TLX” and “NASA TLX” and it returned 2,870 citations between the two terms. The UCF library reports 3,631 articles that contain either NASA Task Load Index, NASA-TLX, NASA TLX. Hart’s search results prove how widely used the NASA-TLX has been over the past 20 years. She describes how the origin of the task load index began in the aviation industry to focus on crew workload. She then explained the six subscales that each represent groups of variables: Mental Demands, Physical Demands, Temporal Demands, Frustration, Effort, and Performance. After describing the subscales, she discussed the weighting of the subscales to be used to compute an overall workload score. She also provided a brief overview of modifications made to the NASA-TLX through its use in numerous studies in several industries and languages. She concludes with an update on the NASA-TLX software and website and describes how it remains as a staple for measuring other theories or models. The NASA-TLX is applicable to the suitability and usability of DXTRS when considering the overall tasks required to learn and train with the simulation system.

Since the NASA-TLX is easily applicable it has been used in several different methodological approaches (Hart, 2006). As a result, the original NASA-TLX is often modified and applied to specific research scenarios. Park and Cha (1998) is a great example of research that modified the NASA-TLX subscales. They used two of the original subscales and modified the other four to evaluate the usability of a navigation system with Korean drivers. Similar to Park and Cha, Lee, Kerns and Bone (2001) also modified the NASA-TLX using just five of the six subscales to evaluate the workload experienced by controllers in an air traffic control setting.

The NASA-TLX subscales have also been discussed in correlation to one another (Hart, 2006). The six NASA-TLX subscales were further defined and correlated by Wilson, Poolton, Malhotra, Ngo, Bright and Masters (2011) as task, subject, and behavior related factors. The task factors are mental demand, physical demand, temporal demand. The subject factor is performance and the behavior factors are frustration and effort. Wilson et al. (2011) defined the factors to prevent from aggregating the NASA-TLX subscale scores and better help identify different types of workload specific to surgery. Alternatively, the raw TLX (RTLX) scores can be used to determine the correlation between subscales. Kamaraj, Dicianno, Mahajan, Buhari and Cooper (2016) conducted a study to assess the stability of the rating of electric-powered wheelchair driving by clinicians and users while using different human-machine interfaces within the Virtual Reality based SIMulator-version 2 (VRSIM2) and in the real world. Kamaraj et al. analyzed RTLX subscale scores and identified a significant difference in workload amongst the different driving conditions. The workload difference was attributed to the mental demand and frustration subscales. The previous examples show that analyzing the subscale scores of the NASA-TLX are just as important as determining the overall weighted workload score.

Finomore et al. (2009) compares the NASA-TLX and the Multiple Resources Questionnaire (MRQ) by comparing the MRQ's vigilance index and the NASA-TLX's sensitivity scale. This study shows that the MRQ recognized unique sets of vigilance tasks during the study that were not measured by the NASA-TLX. Finomore et al.'s study found that the MRQ is effective in measuring workload caused by vigilance tasks. Though the MRQ provides an alternative task load method to the NASA-TLX, the MRQ is not sufficient to determine the suitability of

DXTRS as a sustainment training tool. MRQ limited use at determining vigilance tasks limits its applicability for the DXTRS suitability study.

Current literature does not associate Garcia and Tolk's MOE and MOP with either the TAM or NASA-TLX. This study uses the MOE and MOP to supplement both the TAM and NASA-TLX. Further, this research seeks to explore the level of correlation between performance of the system and its acceptance and task loads when performing as a sustainment training tool.

As Garcia and Tolk (2015) stated, "MOPs assess how well a system performs as originally designed". Assessment of the MOP for DXTRS, includes evaluating how well DXTRS operates with its current enhancements as outlined in appendix A, table A2. DXTRS performance must also be assessed against the desired functionality stated in appendix A, table A1. The appendix G performance questionnaire measures how well the system's logistics functions operate as designed and also determines whether the required capabilities outlined in appendix A, table A1 are available and operate sufficiently based on customer feedback.

Garica and Tolk (2015) also states that "Evaluating effectiveness is based on measures of simulation capabilities in terms of task accomplishment." DXTRS' effectiveness is determined by how well it helps the training unit accomplish its training tasks. Success is determined by evaluating its current capabilities as identified in appendix A, table A2 against the accomplishment of the sustainment tasks identified in appendix B. A unit's ability to complete the tasks listed in appendix B, table B2 is largely based on the performance of the capabilities identified in appendix A, table A2 and directly impact the ratings captured by the questionnaires

in appendices E (TAM survey), F (NASA-TLX questionnaire) and G (DXTRS performance survey). Appendices E and G use the TAM construct to gauge the effectiveness of DXTRS. Whereas appendix F uses the NASA-TLX performance subscale to gauge performance.

Given the abovementioned literature and background there are several research questions that arise. Questions that are the focus of this research are:

1. What is the level of acceptance of DXTRS as a training tool?
2. What is the capability of DXTRS for sustainment training?
3. What is the capability of DXTRS to visualize sustainment assets for users during simulation training?

Research questions one through three are addressed through the identification of MOEs and MOPs as discussed by Garica and Tolk (2015) in conjunction with assessments using the TAM2 and a modified NASA-TLX.

Braun and Clarke (2006) discuss using thematic analysis in psychology. They pragmatically explain thematic analysis and the fact that it provides a good foundation for other forms of qualitative data analysis. It is described as a flexible research tool that can provide detailed account of complex data. They define thematic analysis as a method for identifying, analyzing, and reporting patterns (themes) within data. Lastly, Braun and Clarke provide a six-phase guide to conduct thematic analysis and include examples of research questions and topics that can be used for a study. Their six phases are familiarizing yourself with the data, generating initial codes, searching for themes, reviewing potential themes, defining and naming themes and producing the report. Their guide provides a method for inexperienced qualitative researchers to

properly implement and describe their thematic analysis process. Thematic analysis is a potential analysis method for this study because of the structure and rigor associated with it.

Burck (2005) compares qualitative research methodologies for systemic research. She compares three qualitative research methodologies which include grounded theory, discourse analysis and narrative analysis. Her article explores how qualitative research methodologies can impact systemic psychotherapies. She dives deeper into each of the three qualitative research methodologies and explains their impact on qualitative research. She defines the grounded theory approach as a method to conduct research and analyzing data which aims to generate ideas and theory 'grounded' in the data. Furthermore, she describes both discourse analysis and narrative analysis as ways to analyze research material. Her description of discourse and narrative analysis eliminates the idea that either approach is also a framework for research. She states that discourse analysis is a close scrutiny of language to understand the social worlds of research participants. It determines the ways in which certain themes and topics are discussed while disregarding others. Alternatively, narrative analysis focuses on the ways in which people present their accounts of themselves and views self-narrations both as constructions and claims of identity. She explains the three different types of narrative analysis that analysts can use to gain a better understanding of qualitative data. The three approaches to narrative analysis are life story, sequence of core narratives, and poetic stanza transcription.

In the life story method, the analyst derives an account from the text of the interview. The researcher tells the story as if in their shoes and then examines the story. The sequence of core narratives examines the connections within the sequence of core narratives in an interview and the thematic connections between them. Poetic stanza transcription is re-transcribing the

narrative as poetry to analyze and organize its similarities or metaphors. The type of narrative analysis selected is dependent upon what the researcher wants to examine and why.

Burck provides a comprehensive review of qualitative research methodologies. Her comprehensive description of the different types of narrative analysis were beneficial. However, the qualitative analysis options she provided are not relevant to this study and seem more appropriate for psychological or psychotherapy applications.

Burnard et al. (2008) provides an overview of how to approach qualitative data analysis using a dental health study as an example. In their overview they define and explain the difference between inductive and deductive analysis. Briefly explained, the inductive analysis approach involves not using a predetermined framework or theory while the deductive approach involves using some sort of analytical structure, predetermined theory or framework to analyze the data. The inductive approach is more comprehensive and arduous but provides an opportunity to determine emerging themes and theory from the data. Alternatively, the deductive approach is quicker and easier, but it is not as easily adaptable to the data and can potentially bias the analysis process and limit theme and theory development. Burnard et al. further explained their example data using inductive thematic content analysis. Next, they coded the data by hand and mentioned the use of available computer assisted qualitative data analysis software (CAQDAS) packages like ATLAS.ti and NVivo. The aforementioned programs help researchers manage data, but the researcher is responsible for analyzing the data. They address verification and validation of data analysis through the peer review process but admits that it is time consuming and unnecessary. Lastly, they discuss two approaches to writing and presenting

qualitative research. The first approach is to report key findings under each main theme or category using verbatim quotes to demonstrate the findings. The quotes are also explained in a separate discussion chapter that links the findings to existing research. The second approach is to include the findings and discussion together in the same chapter.

Despite different fields of study, Burnard et al's approach to qualitative research was very similar to Braun and Clarke's thorough example of thematic content analysis. Braun and Clarke's thematic content analysis process and Burnard et al's explanation of inductive analysis seem appropriate for this study because it provides a process with rigor and allows the data to potentially provide additional insight to the research.

DiCicco-Bloom and Crabtree (2006) covers several qualitative interviewing strategies. They discuss unstructured, semi-structured and in depth face to face interviews. Additionally, they provide additional detail in regards to conducting face to face in-depth interviews. Unstructured interviews are described as guided conversations because they are somewhat unstructured though some structure is required to adequately prepare for the interview itself. Unstructured interviews have also been conducted and combined with observational data. Semi-structured interviews are typically the only data source for a qualitative research project and usually scheduled in advance and designed around a set of prearranged open-ended questions. Some questions develop from the conversation between interviewer and interviewee. The semi-structured in-depth interview is the most commonly conducted interview method for qualitative research. This technique typically occurs once and lasts between 30 minutes to several hours. Lastly, the individual in-depth interview allows the researcher to further examine societal and private problems. This

interview technique can be done individually or as a group. The group method is typically referred to as a focus group and gains a broader range of experience amongst participants.

Nellis (2016) investigates the use of interviews as data collection instruments. Unlike DiCicco-Bloom and Crabtree who covered three different types of interview techniques, Nellis covers just two and discusses the advantages and disadvantages of them. He explains that semi-structured interview questions are predetermined prior to the interview. He also adds that the frequency of delivery of the questions can vary between interviewees, however, the interviewer generally asks the same questions. In this technique, the interviewer has the flexibility to probe for deeper understanding amongst the responses given. The advantage of this method is that it can be used with virtually all qualitative research methods. The disadvantage to this technique is that it is not as exploratory as an unstructured interview which limits the interpretation of the findings.

He explains that unstructured interviews use topics to guide conversation rather than research questions. The unstructured interviews are regarded as more experiential than the semi-structured interview technique because it allows the interviewee to freely tell their story. In the unstructured technique, the interviewer can use a technique called "mirroring" to summarize the story told by the interviewee and confirm understanding. The advantage to this technique is that they are used to design more structured studies for future research. The disadvantage to this technique is that it lacks structure and can be a challenge for a novice researcher.

DiCicco-Bloom and Crabtree (2006) and Nellis (2016) effectively explained the different interview methods. Collectively they provide a solid basis to select an appropriate interview technique for this study.

CHAPTER THREE: METHODOLOGY

Army sustainment units need a cost-effective alternative to maintain their sustainment operations and planning proficiency. With the increased functionality provided in version 1.06, DXTRS may be a solution for sustainment training. I propose that sustainment units purposefully consider using DXTRS as a cost-effective training solution to maintain proficiency. Its ability to interoperate with CPOF, and JCR potentially eliminates the need for external methods to track equipment and supplies during training exercises.

The specific questions of interest for this study are: Is DXTRS sustainment capability sufficient for training sustainment tasks for brigade and below organizations? Does the interoperability with JCR and CPOF eliminate the need to manually track logistics operations during training? Does DXTRS logistics reports provide adequate information for staff officers to sufficiently inform the commander and populate the COP during training?

Table two below depicts Army sustainment operations as previously shown in table 1 with emphasis on Tactical operations since it is the echelon of focus for sustainment training with DXTRS. Figure four illustrates the Army battlefield application of sustainment units as discussed in table two.

Table 2: Army Sustainment Operations

Army Battlefield Level	Level Description	Echelon/Unit Supported	Headquarters Responsible for Sustainment Support	Current & Recent Past Corresponding Supporting Training Systems
Strategic	"Integrate joint, inter-organizational, and multinational partners to build capability."	COCOM Joint Force Commander	Theater Sustainment Command (TSC)	BCS3 (MRF) JDLM (MRF)
Operational	"Support to and assist with force deployment and sustain operations to enable freedom of action and operational reach across multiple theaters."	Division Corps	Sustainment Brigade (SUST BDE) Expeditionary Sustainment Brigade (ESC)	WARSIM (MRF) JCATS (ERF) JDLM (MRF) BCS3 (MRF) DXTRS
Tactical	"Deliver supplies and services to the warfighter to enable cross-domain maneuver and prolong endurance."	Brigade Battalion Company	Brigade Support Battalion (BSB) Field Service Company (FSC)	JCATS (ERF) WARSIM (MRF) WARSIM-B (MRF) **DXTRS** JDLM (MRF) BCS3 (MRF)

Source: Army, 2017; CASCOM , 2014.

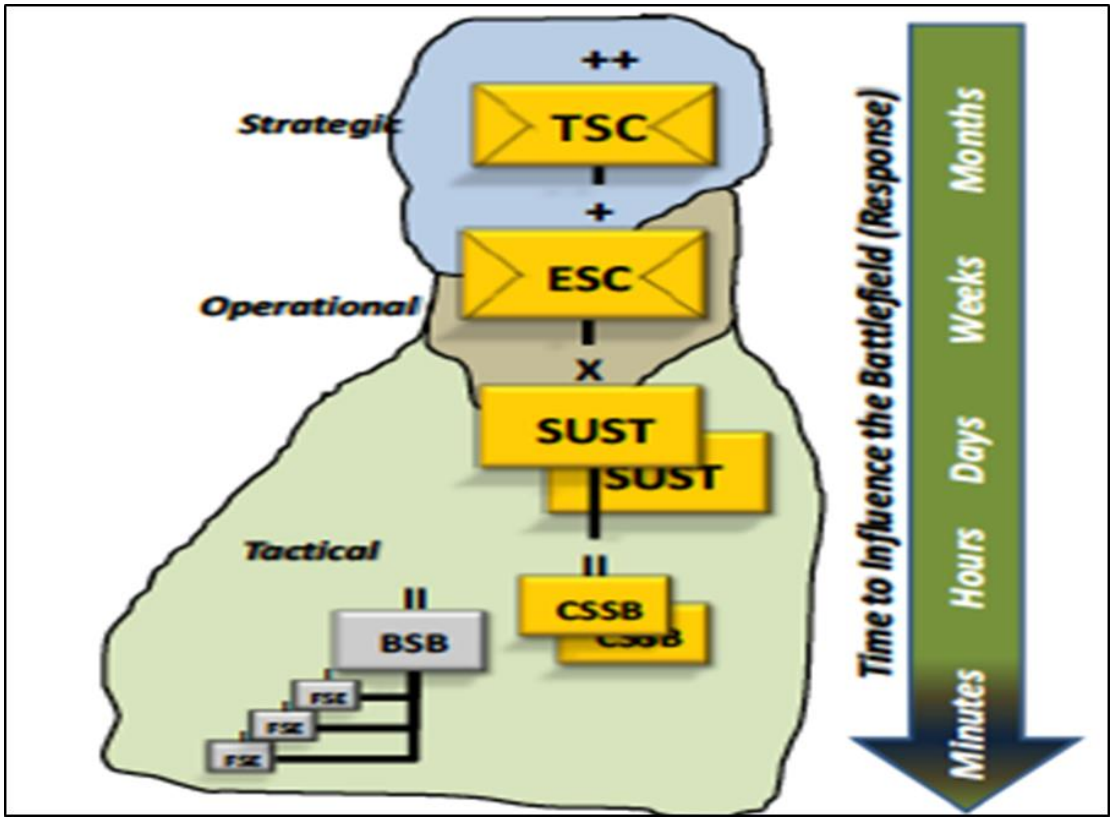


Figure 4. Army Sustainment Battlefield Operations

Source: CASCOM, 2014, p. 11

Considering the previously discussed articles and research efforts this study focuses on the suitability of DXTRS as a sustainment training solution. Venkatesh and Davis'TAM2 is used as a basis to determine the suitability of DXTRS for sustainment training. Figure five below illustrates the application of TAM2 for DXTRS.

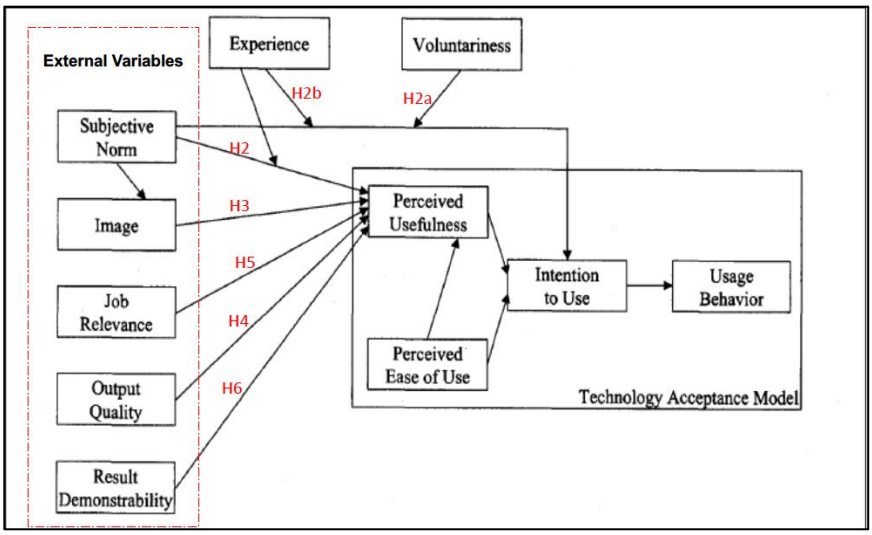


Figure 5. TAM2 applied to DXTRS Study

The social influence and cognitive instrumental variables of Venkatesh and Davis (2000) TAM2 are applied to this study and further defined below. The definitions of the TAM2 variables are defined in the context in which they apply to the DXTRS suitability study and maintain the authenticity of the original definition.

Social Influence Variables

Subjective Norm. the perception a leader has as to whether his/her peers and leadership supports the use of DXTRS for sustainment training.

Image. image is the degree to which a leader perceives the use of DXTRS to train sustainment enhances his or her standing within the organization.

Voluntariness. the perception that a leader has as to whether or not his or her decision to use DXTRS is voluntary or non-mandatory.

Experience. refers to a leader's prior usage with DXTRS.

Cognitive Instrumental Variables

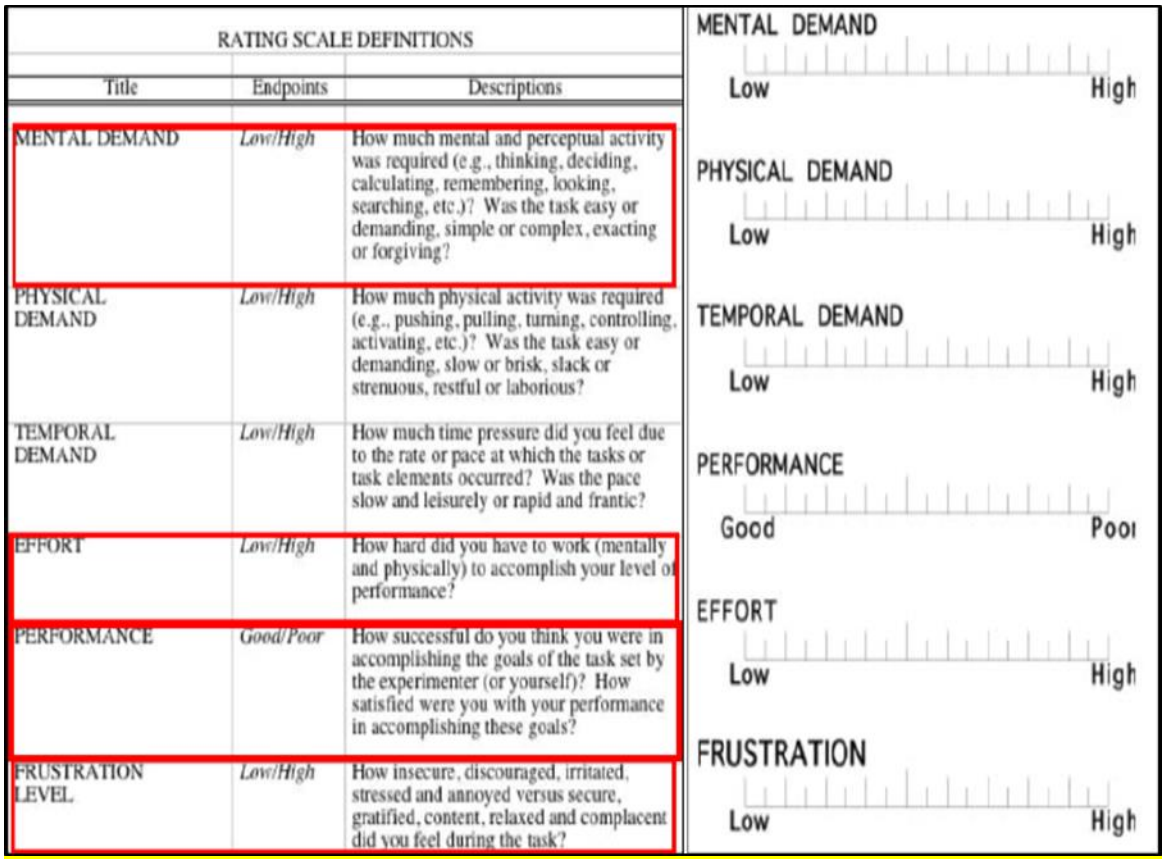
Job Relevance. the degree to which a leader perceives DXTRS is applicable to his/her job.

Output Quality. the degree to which DXTRS perform sustainment tasks and match the goals of leaders (users).

Result Demonstrability. the degree to which leaders attribute DXTRS for improved job performance.

The NASA-TLX workload assessment is also used to evaluate the suitability of DXTRS for sustainment training. It provides an overall workload score and includes six subscales: Mental, Physical, Temporal Demands, Frustration, Effort, and Performance (NASA, 1986). Given that this study focuses on the suitability of DXTRS, the most applicable subscales of the NASA-TLX are mental workload, effort, frustration and performance. Responses to the four subscales helps gauge the acceptance and suitability of DXTRS as a logistics training alternative. I anticipate that the perceived usefulness in the TAM correlates to the NASA-TLX mental demand and performance subscales. It is also likely that the NASA-TLX and TAM variables link to Garcia and Tolk's MOP. For example, the responses for the performance and mental demand subscales may be similar to those provided in the TAM survey to measure performance as defined by Garcia and Tolk. Both the mental demand and performance categories could potentially affect how a user perceives their experience and usefulness of the system. Likewise, I believe that the NASA-TLX frustration and effort subscale responses will relate to the TAM intention to use variable. As the frustration level and/or effort level of a user increases while using DXTRS, it is likely that his/her intention to use the system again is negatively impacted. It is also likely that

the responses for the effort and frustration subscales will be similar to those for the MOE. Figure six below outlines the NASA-TLX definitions and rating scales. The four subscales for this study are outlined in red.



RATING SCALE DEFINITIONS

Title	Endpoints	Descriptions
MENTAL DEMAND	*Low/High*	How much mental and perceptual activity was required (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?
PHYSICAL DEMAND	*Low/High*	How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?
TEMPORAL DEMAND	*Low/High*	How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred? Was the pace slow and leisurely or rapid and frantic?
EFFORT	*Low/High*	How hard did you have to work (mentally and physically) to accomplish your level of performance?
PERFORMANCE	*Good/Poor*	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?
FRUSTRATION LEVEL	*Low/High*	How insecure, discouraged, irritated, stressed and annoyed versus secure, gratified, content, relaxed and complacent did you feel during the task?

Figure 6. NASA-TLX Definitions and Rating Scale

Source: Hart, 2006

The hypotheses for this study are:

H1: DXTRS is a suitable training solution for sustainment training.

H2: DXTRS acceptance is highest amongst leaders whose organizations subjective norm supports training with the system.

H2a: The intention to use DXTRS is positively affected by the users perceived non-mandatory usage of DXTRS.

H2b: DXTRS usage is positively influenced by the users experience with DXTRS.

H3: DXTRS acceptance as a sustainment training solution is positively affected by perceived usefulness and image.

H4: DXTRS perceived usefulness as a sustainment training solution is positively influenced by its output quality.

H5: DXTRS usage is highest amongst leaders with high job relevance.

H6: The perceived usefulness of DXTRS is positively influenced by user's perception of improved job performance.

H7: The intention to use DXTRS is negatively affected by NASA task load subscales frustration, mental demand and effort required to use the system.

H8: DXTRS logistics functionality negatively impacts performance rating

> H8a: Sustainment training task achievement is negatively influenced by DXTRS logistics functionality.
>
> H8b: A user's ability to meet overall training objectives is negatively impacted by DXTRS logistics performance.

Participants and Materials

There are 22 participants needed for this study. The participants for this study are located at various U.S Army installations (Fort Campbell, KY; Fort Rucker, AL & Fort Lee, VA). They will take three surveys designed after the TAM and a modified version of the NASA-TLX to determine their acceptance of DXTRS and its appropriateness as a sustainment training tool. The primary target population for this study are Army logistics officers in the grade of O3-O5. Though, Army officers O3-O5 with an operations role should also be included in this study. This population reflect officers at various levels from battalion through division that are either logistics officers by military specialty and/or responsible for operations at their organization which typically includes planning the training for it. Participants for this study were found through various methods. Some participants were found through personal contacts and others

were found through a military professional discussion forum called Simulations Operations Network (SIMOPS NET). An example of the correspondence on SIMOPS NET can be found in Appendix I.

This experiment assesses the suitability of DXTRS version 1.06 or newer. It can be downloaded via the Army Milgaming website and then stored and used locally by Army units. Before commencing the study, the protocol (Appendix P), written informed consent (Appendix O), surveys (Appendices D-G) and command approval memorandums (Appendix N) will be submitted to the UCF Institutional Review Board (IRB) for approval. This study is completely voluntary and does not offer compensation for participation. The terms of the study are briefed to all participants. After the brief, the participants receive a written informed consent form (Appendix O) to sign, demographic survey (Appendix D), two suitability surveys (Appendix E & F) and a performance survey (Appendix G). The volunteers manually fill out the surveys and provide feedback on the suitability and acceptance of DXTRS for sustainment training. After completion of the surveys, the participants are debriefed using the debriefing form (Appendix R). Finally, the data collected from the study is compiled and analyzed to determine trends and provide potential solutions.

The Cronbach Alpha is used to test the reliability and validity of responses. The Cronbach alpha measures how close a set of items are as a group (Tavakol & Dennick, 2011). It is a number between 0 and 1. If the items within a test are correlated to each other, the value of alpha is increased (Tavakol & Dennick, 2011).

Assumptions

Given the scope of this study the following assumptions were made: 1) DXTRS will remain a program of record and available for use throughout the Army and DoD. Additionally, it will continue to be improved to meet the operational needs of Soldiers. 2) The pending departure of JDLM and fielding of its replacement includes a lapse in sustainment training capability. Though a timeline was not provided by PEO-STRI or LESD the contractual support for LOGFED/JDLM has an expiration date, and thus the potential for a lapse in sustainment training capability is possible. 3) DXTRS is used as an alternative to WARSIM-B due to the discontinuation of JCATS. Lastly, DXTRS version 1.04 or earlier is not adequate to support sustainment training as a standalone system.

Limitations

Surveys are the primary research tool for this study. As a result, there are some inherent limitations. Since surveys are voluntary, responses are dependent on the willingness of the participants which can impact the sample size for the study. This research does not address the replacement of BCS3 as a mission command system or fielding of a new technology to satisfy the sustainment training void. Lastly, due to the scope of the research project this study does not explicitly conduct user testing of DXTRS, however, performance data is captured to help determine the fitness of the system for sustainment training.

CHAPTER FOUR: INTERVIEW AND ANALYSIS TECHNIQUES

This study was originally designed to gather survey data from DXTRS users following several real-world training exercises at numerous locations. Four surveys which include one biographical survey, two suitability surveys and a performance survey were created to gather the essential data required to conduct a comprehensive study and analysis of DXTRS ability to serve as a logistics training tool. Additionally, interview questions (Appendix H) were also created to augment the data from the four survey's. Although the aforementioned data collection plan provided a great path for a successful study, it was short lived. The original data collection plan was overcome by several bureaucratic academic and military scholastic requirements. The additional administrative requirements delayed my attendance at planned exercises past my availability window and the next planned exercise.

Qualitative Interview Techniques

This section offers a more in depth view of interview techniques. The characteristics of interview techniques are captured in table three below. It is a merging of information from both DiCicco-Bloom and Crabtree (2006) and Nellis (2016).

Table 3. Qualitative Interview Techniques

Technique	Pros	Cons
Structured	- very structured - can be used in quantitative research	- rigid interview process - limited subject exploration
Semi-structured	- minimal structure - use with all qualitative analysis methods - vary frequency of question delivery - probe for additional understanding	- limits the interpretation of research findings - occurs once - difficult for novice researcher
Unstructured	- no structure - most exploratory method - maximizes the interpretation of research findings - used to design additional research	- lacks structure - extremely difficult for novice researcher
Individual In-Depth	- deeper examination of societal and personal issues - individual or group use - inform a wide range of research questions	- time consuming - prone to bias - potential role deviation

Source: DiCicco-Bloom and Crabtree, 2006; Nellis, 2016.

Qualitative Data Analysis Techniques

As discussed in chapter two, there are several ways to conduct and analyze qualitative research. Some of the most common qualitative data analysis methods are thematic content analysis, grounded theory, narrative analysis, deductive analysis and inductive analysis. The unique characteristics of each of the common qualitative data analysis techniques are addressed in table four below.

Table 4: Qualitative Data Analysis Techniques

Technique	Pros	Cons
Thematic Analysis	- provides foundation for other forms of qualitative data analysis - flexible - reports patterns/themes within data	- flexibility can lead to an "anything goes" research approach - limited interpretive power if analysis excludes theoretical framework - may miss nuanced data
Grounded Theory	- aims to generate ideas grounded in the data - provides sequential guidelines for qualitative research - legitimizes qualitative research - exploratory	- complex methodology - confusing terminology - not a good method for novice qualitative - no standard rule for identifying categories
Narrative Analysis	- several approaches for people to present their accounts of themselves - seeks to understand a person's experience	- may input meaning not in original to narrative - may ignore broader influences - captures limited experiences
Deductive Analysis	- quicker and easier than inductive analysis - requires predetermined framework or theory	- requires predetermined framework or theory - not easily adaptable to data - can potentially bias data interpretation
Inductive Analysis	- doesn't require a predetermined framework - involves comprehensive analysis - helps determine emerging themes and theory from data	- doesn't require a predetermined framework or theory - process is time consuming

Source: Braun & Clarke, 2006; Burck, 2005; Burnard et al., 2008.

The primary data collection plan for this study is a post event face to face and telephonic interview instead of surveys at the training location. During the interview, notes are taken manually without the support of voice recording. Voice recording is not permitted for this study because it was not requested during the IRB approval process. The data will be separated into three groups (command, expert and novice). The command group identifies personnel that have

significant influence on the types of simulations used for training. Additionally, this selective group of people have a position of authority over potential exercise personnel or the facilities and systems required for training.

The expert group is comprised of personnel that have extensive knowledge of different types of simulations and have previously used DXTRS.

The novice group is comprised of personnel with some knowledge of simulations and minimal knowledge of DXTRS.

The change in data collection also resulted in a change to data analysis. The inductive thematic content analysis is used to analyze the qualitative interview data. In terms of data collection and analysis, the inductive thematic content analysis, provides an opportunity to gain new insight from the data and determine additional themes. Question nine of appendix H is an open-ended question which provides a chance for additional insight. Although inductive analysis is heralded for providing rigor and flexibility to qualitative research there are some disadvantages to the method. The disadvantage to using inductive analysis is that the data analysis process takes more time than deductive analysis. Furthermore, a pre-existing framework is typically not used. Without a pre-identified framework or theory, researchers are free to interpret and categorize data as they deem necessary. The flexibility of this method provided by not using a framework or theory, could cause researchers to be too flexible in their classification and determination of relevant themes or categories.

In contrast, using deductive thematic content analysis would constrain me to code all of the qualitative interview data in accordance with the TAM. The drawback to the deductive approach is that new insights provided during the research may be misinterpreted in favor of confining the

data to the specified TAM construct. Grounded theory was not chosen as the data analysis method because it involves a more iterative interview process. Initial data analysis influences and causes modification of the interview format to explore identified concepts in more depth (Burck, 2005). Due to the limited time available to conduct interviews and data analysis, interviewing additional personnel to provide greater depth on a specific topic was not feasible. Narrative analysis was not selected because this study is not concerned about how the participants present their stories or their claim of identity within the story. This study focuses on the participants thoughts about DXTRS and other simulations systems as it pertains to logistics training.

Data Analysis Process

The data for this study was collected and analyzed using a combination of Virginia Braun and Victoria Clarke's (Braun & Clarke, 2006) detailed thematic analysis process as well as Kent Lofgren's (Lofgren, 2013) interview analysis technique as described in his YouTube channel (https://youtu.be/DRL4PF2u9XA). The process for conducting the interview and analyzing the data is described in table five below. Table five is a combination of Braun and Clarke and Lofgren's processes.

Table 5. Interview and Data Analysis Process

1	Conduct interview with participants (responses written manually)
2	Transcribe interview notes on Microsoft word document
3	Read interview transcripts for coherency
4	Re-read interview transcripts for understanding
5	Code interview transcripts
6	Search and Identify themes
7	Identify similarities/connections amongst themes
8	Discuss and interpret results (link to studies, theories and/or concepts)

Source: Braun & Clarke, 2006; Lofgren, 2013.

CHAPTER FIVE: NEW METHODOLOGY

Purpose

The purpose and specific questions of interest for this study remain the same as presented in chapter three despite the change in methodology. As a reminder, the specific questions of interest that need to be assessed during this interview-based study are: Is DXTRS sustainment capability sufficient for training sustainment tasks for brigade and below organizations? Does the interoperability with JCR and CPOF eliminate the need to manually track logistics operations during training? Does DXTRS logistics reports provide adequate information for staff officers to sufficiently inform the commander and populate the COP during training?

As mentioned in chapter three, this study seeks to inform the suitability of DXTRS to sustain the logistics training of brigade and below sustainment units. Though the opportunity to assess the suitability of DXTRS using several different types of post exercise surveys was not feasible, valuable feedback from exercise participants through face to face and telephonic interviews were just as effective. A rigorous qualitative data analysis method was selected to mitigate the possibility of selecting insignificant data as emerging themes or theories. As discussed in chapter three, Venkatesh and Davis (2000) TAM2 was used as a framework for the interview questions so that the responses to the interview questions could potentially inform the variables within the TAM2. The use of the TAM2 as a framework for the interview questions presents an argument for deductive data analysis, however, this study is dedicated to allowing the data to determine the

significance of themes and theory and not the TAM2. TAM2 variables are used to explain data where applicable. If the data presents themes not covered by the TAM2, a new category will be used to identify and explain it in lieu of forcing the emerging theme into a TAM2 "box".

With the change in methodology several hypotheses were expunged because they could not be reasonably informed by an interview. The hypotheses for this study are included below. The hypotheses in red represent those that cannot be reasonably informed by the change in data collection.

The hypotheses are:

H1: DXTRS is a suitable training solution for sustainment training.

H2: DXTRS acceptance is highest amongst leaders whose organizations subjective norm supports training with the system.

H2a: The intention to use DXTRS is positively affected by the users perceived non-mandatory usage of DXTRS.

H2b: DXTRS usage is positively influenced by the users experience with DXTRS.

H3: DXTRS acceptance as a sustainment training solution is positively affected by perceived usefulness and image.

H4: DXTRS perceived usefulness as a sustainment training solution is positively influenced by its output quality.

H5: DXTRS usage is highest amongst leaders with high job relevance.

H6: The perceived usefulness of DXTRS is positively influenced by user's perception of improved job performance.

H7: The intention to use DXTRS is negatively affected by NASA task load subscales frustration, mental demand and effort required to use the system.

H8: DXTRS logistics functionality negatively impacts performance rating

H8a: Sustainment training task achievement is negatively influenced by DXTRS logistics functionality.

H8b: A user's ability to meet overall training objectives is negatively impacted by DXTRS logistics performance.

Target Population

The target population for this study are Army logistics officers in the rank of Captain through Lieutenant Colonel or grade of O3-O5. This population reflect officers at various levels from battalion through division that are either logistics officers by military specialty and/or responsible for operations at their organization which typically includes planning the training for it. Non-logistics officers, Department of the Army civilians and DoD contractors are also considered if they fulfill an operations or training role within their organization. Participants for this study were found through various methods as indicated in chapter three.

Materials

This study assesses the suitability of DXTRS version 1.06 or newer. It can be uploaded via the Army Milgaming website and then stored and used locally by Army units. Before commencing the study, the written informed consent (Appendix O), interview questions (Appendix H) and command approval letters (Appendix N) will be submitted to the UCF Institutional Review Board (IRB) for approval. Following the UCF IRB approval (Appendix J), the Department of the Army conducts a research protection administrative review (RPAR)(Appendix K) on the data collection documents for the study. Simultaneous to the RPAR, a level II operations security review will be conducted by PEO-STRI G2 (Appendix M). After the level II operations security approval, the Army Research Institute (ARI)(Appendix L) reviews and approves the data collection documents. This study is completely voluntary and does

not offer compensation for participation. The terms of the study is briefed to all participants. After the brief, the participants receive a written informed consent form to sign. After receiving the signed consent form the participants are interviewed using the questions from Appendix H. Following the interview, the participants are debriefed (Appendix R). The data collected from the study (Appendix Q) will be compiled and analyzed using inductive thematic content analysis which is a form of qualitative data analysis.

Assumptions

Given the scope of this study the following assumptions were made: 1) DXTRS will remain a program of record and available for use throughout the Army and DoD. Additionally, it will continue to be improved to meet the operational needs of Soldiers. 2) The pending departure of JDLM and fielding of its replacement includes a lapse in sustainment training capability. Though a timeline was not provided by PEO-STRI or LESD the contractual support for LOGFED/JDLM has an expiration date, and thus the potential for a lapse in sustainment training capability is possible. 3) DXTRS is used as an alternative to WARSIM-B due to the discontinuation of JCATS. Lastly, DXTRS version 1.04.0 or earlier is not adequate to support sustainment training.

Limitations

An interview is the primary research tool for this study. However, interviews as a form of data collection for research has some limitations. According to Wilkinson and Birmingham (2003) and Opdenakker (2006) the advantages and disadvantages of a face to face interview methodology is that it gives the researcher a better awareness of the significance of the participants response, the is a higher response rate for questions than surveys, researcher can

glean additional information from the interviews or ask follow-up questions to clarify responses, participants tend to see interviews as an chance to express their beliefs.

The cons of an interview methodology as indicated by Wilkinson and Birmingham (2003) and Opdenakker (2006) is that it is resource intensive, involves one on one interaction, data collected provides gross assessments and lacks statistical relevance, requires the interviewer or researcher to possess great interviewing skills, interviews can be controlled by the hidden agendas of the interviewer, and not statistically relevant, interviews can be confounded by other variables, the sample size is limited by available resources and the analysis process is tedious and slow. The interview format for this study was adopted because it was an achievable solution considering the imposed time and availability constraints.

Another limitation of this research is that it does not address the replacement of BCS3 as a mission command system or the fielding of a new technology to satisfy the sustainment training void. Additionally, this study included participants from only three of the 19 known locations that train with DXTRS. This is primarily due to the change in methodology for the study and also because of available time to conduct the study. The Houston, Texas MTC site had a larger number of participants because the organization provided a commanders' letter to be interviewed and had an exercise that fit my timeline.

The interview documentation was also a limitation of this research. Despite receiving IRB approval for this study, I failed to include voice recording as a secondary data collection method for the interview and as a result I was not able to voice record the interviews for this study. Moreover, I should have also added a second person to this study so that one person could have

been a scribe during the interviews. I grossly over estimated my ability to listen, talk and take notes. An additional person would have made the interview process significantly easier. Lastly, this study does not explicitly conduct user testing of DXTRS, however, some performance data is captured from the interview data collection method to help determine the fitness of the system for sustainment training.

Relationship Between Interview Questions, Research Hypotheses and Analysis Design

Interview Question 1. What is your current duty position?

H5: DXTRS usage is highest amongst leaders with high job relevance.

Question 1 of the interview identifies the participants current job or duty title. This basic demographic information can be used during data analysis to help determine if there is a linkage between duty position, experience and associated DXTRS feedback. This question also relates to hypothesis 5 which seeks to inform DXTRS usage with job relevance. Responses to this question and question 2 confirms the validity of the identified hypothesis.

Interview Question 2. Have you used DXTRS v 1.060 for training?

Sub question 1. **If yes,** please share your thoughts on how the logistics functions worked?

Sub question 2. **If no,** why didn't you use DXTRS v 1.060?

H2b: DXTRS usage is positively influenced by the users experience with DXTRS.

H4: DXTRS perceived usefulness as a sustainment training solution is positively influenced by its output quality.

Question 2 of the interview specifically identifies the participants experience with the DXTRS version 1.060. The responses are expected to inform the actual usage behavior from the TAM2. The two sub questions address the TAM2 variables results demonstrability and Output Quality. Both variables influence a user's perceived usefulness of the system and ultimately the actual use of it. This question also links to hypotheses 2b and 4. The responses to this question should affirm the linked hypotheses.

Interview Question 3. Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

Sub question 1. **If no**, why (explain using your best judgment based on previous experience)?

H1: DXTRS is a suitable training solution for sustainment training.

H3: DXTRS acceptance as a sustainment training solution is positively affected by perceived usefulness and image.

Question 3 of the interview seeks to identify the participants perceived usefulness of DXTRS version 1.060. This question is also revealing the participants perceived performance of the system. This question also links to hypotheses 1 and 3 and should confirm whether participants believe DXTRS is a suitable sustainment training solution.

Interview Question 4. Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc.?

Sub question 1. **If yes,** can you describe the work or effort required?

Sub question 2. **If no**, why?

H4: DXTRS perceived usefulness as a sustainment training solution is positively influenced by its output quality.

H8: DXTRS logistics functionality negatively impacts performance rating

Question 4 of the interview specifically address a critical technical aspect of the system as it relates to its connectivity to an organization's mission command systems and help develop the commanders COP. The responses to this question inform the TAM2 output quality variable as well as the perceived usefulness of the system. The sub questions seek to gain a greater depth of information in regards to the technical performance of the system and also informs the previously mentioned TAM2 variables. Also, this question links to hypotheses 4 and 8. The analysis of the interview responses for this question will confirm or deny the linked hypotheses.

Interview Questions 5&6. Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

Sub question 1. **If yes,** is using DXTRS v.1.060 mandatory?

Sub question 2. **If no**, why?

H2: DXTRS acceptance is highest amongst leaders whose organizations subjective norm supports training with the system.

H2a: The intention to use DXTRS is positively affected by the users perceived non-mandatory usage of DXTRS.

Question 5 of the interview attempts to understand the participants organization acceptance of DXTRS by specifically asking a question that informs the subjective norm variable of the TAM2. The analysis of this question should identify if the participants organization accepts DXTRS. If the question is answered in-depth, this question could also identify the image variable of the TAM2. Question 5 links to hypothesis 2 and participant responses should confirm or deny the stated hypothesis. The sub questions (labeled question 6 in Appendix H) also seek to inform the voluntariness variable of the TAM2 by asking if the system is required for use. The sub questions link to hypothesis 2 sub hypothesis a. Participant responses to this sub hypothesis should also corroborate the validity of the specified hypothesis.

Interview Question 7. Do you think that most organizations would find DXTRS v.1.060 easy to use?

Sub question 1. **If no**, why?

H2b: DXTRS usage is positively influenced by the users experience with DXTRS.

Question 7 of the interview questions seeks to inform the TAM2 perceived ease of use. The participants response to this question should also identify their intention to use DXTRS in the future. The sub question seeks to gain a greater understanding of the participants DXTRS experience.

Interview Question 8. Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

Sub question 1. **If no**, what improvements would you make?

H1: DXTRS is a suitable training solution for sustainment training.

Question 8 of the interview questions seeks to provide an overall performance assessment of DXTRS version 1.060 from a user's perspective. The responses to this question significantly influence the participants intention to use as well as the actual use of DXTRS version 1.060.

Interview Question 9. Do you have any additional comments about using DXTRS v.1.060 for logistics training?

Question 9 of the interview questions provides an opportunity for participants to provide additional feedback and recommendations in regards to their experience with DXTRS version 1.060. This question also opens the door for users to provide additional feedback as they see fit. If a respondent is comfortable during the interview, it is likely that feedback in regards to the exercise, or other systems may be revealed. This information can provide additional insight that inadvertently impacts DXTRS system use.

CHAPTER SIX: DATA COLLECTION AND ANALYSIS

This section provides the key insights from the interview responses. They are provided utilizing the group that gave the response. As stated in chapter four, the analysis groups are Command, Expert and Novice.

Data Collection

The original methodology for this study called for post exercise survey administered onsite at the training location to Logistics Officers in the rank of Captain (O-3) to Lieutenant Colonel (O-5). Department of the Army (DA) civilians and Department of Defense (DoD) Contractors were also able to participate in the study if they held an operations job.

This study lightly adhered to its target population. However , the participants were mostly DoD civilians and contractors performing some type of operations role for their organization instead of logistics Soldiers. I did not have as many logistics officers participate as intended because of the limited timeframe available to conduct the study. The number of total participants for this study are identified by "N". For this study, N = 1 0.

Table six below, outlines the participants military rank and occupation with their civilian equivalent responsibility as defined by the Wisconsin Department of Veterans Affairs (2018) to provide more context into the participants skillset and expertise. As shown in table six, the participants for this study had a diverse background which provided a varied degree of knowledge and perspective for this study.

Table 6: Participant Information

Participant	Rank	Military Job	Civilian Equivalent Job
1	LTC	FA57 (Simulation Operations Officer)	Senior Manager/Vice President
2	CPT	Aviation Officer	Aircraft Pilot/Operations Manager
3	DoD Contractor	Simulation Trainer	Simulation Trainer
4	CPT	Logistics Officer	Mid-level Logistics Manager
5	DoD Contractor	Simulation Trainer	Simulation Trainer
6	MAJ	Aviation Officer	Advanced Aircraft Pilot/ Senior Operations Manager
7	DoD Contractor	Database Manager	Database Manager
8	MAJ	FA57 (Simulation Operations Officer)	Senior Project Manager
9	DA Civilian (GS12/13)	CP36	Director/Senior level Manager
10	DoD Contractor	Simulation Trainer	Simulation Trainer

Source: https://dva.wi.gov/Documents/educationEmploymentDocuments/Ranks.pdf retrieved on 31October 2018 by TJ Naylor)

Ten people were interviewed for this study. The participants knowledge of simulations and familiarity of DXTRS varied. The participants for this study were located at various U.S Army installations (Fort Rucker, AL, Fort Dix, NJ and Houston, TX). Table seven presents a more in depth account of each participants location and type of interview conducted. The participants were asked a total of nine questions with some questions including sub questions. The interview questions were intended to determine the participants acceptance of DXTRS and its appropriateness as a sustainment training tool.

For the four face to face interviews, I briefed each participant about the study and asked them to sign the informed consent form. I then began the interview using my interview questions

as the guideline for the interview execution. During the interview, I asked each interview question and allowed the participant to respond to the question. I took notes as the participant spoke and paid close attention to the participants response to confirm if their response adequately answered the question asked. At the conclusion of the interview, I debriefed the participants using the debriefing form (Appendix R). I safeguarded the data by placing it into a briefcase with a lock.

For the five telephone interviews, I emailed the participants the study protocol and informed consent form to gain approval and schedule the interview with the participant. The participants responded via email that they were interested in participating in the study and gave me a time that best fit their schedule. On the date given, I called the participants and went over the informed consent form and the study protocol briefly to confirm their participation in the study. Following the administrative tasks, I began the interview by asking the participants the interview questions and took notes of their responses. At the conclusion of the interview, I debriefed the participants using the debriefing form (Appendix R). I safeguarded the data by placing it into a briefcase with a lock. Lastly, I sent a follow up email to the participants thanking them for their time and reminded them (if needed) to sign and return the consent form that was emailed to them.

There was one email participant for this study. I initially communicated with the participant via telephone as a follow up conversation to a prior email. The telephone conversation was recaptured by the participant and emailed to me with the consent to include the comments in this study. Due to a hectic traveling schedule, the participant was not available for a formal interview

but wanted to share the insights from our discussion with me for inclusion in this study. I responded to his email with a consent form, study protocol and debriefing form to review at his leisure. The participant was not able to sign the consent form provided but did provide consent in his email.

Table 7: Participant Location and Interview Technique

Participant	Interview Technique	Location
1	In-Person	Houston MTC
2	Telephone	Fort Rucker, AL
3	In-Person	Houston MTC
4	In-Person	Houston MTC
5	In-Person	Houston MTC
6	Telephone	JBMDL, NJ
7	Telephone	Houston MTC
8	Telephone	JBMDL, NJ
9	Telephone	JBMDL, NJ
10	E-Mail	Houston MTC

Several interview techniques were used to collect data for this study. The interviews were conducted using the semi-structured interview technique because it provided a structure to guide the interview but also flexibility to delve into detail based on the participants responses if needed. Due to time constraints and limitations some of the intended face to face interviews were conducted by telephone and email. The telephone and email methods were productive in terms of receiving feedback from the participants. I found that the telephone interviews were the most productive when considering time and feedback provided. The telephone conversations seemed to stay on topic easier than the face to face interviews. Alternatively, I found that the face to face interviews tended to go off topic yet provided enough dialogue for the participant to talk open and freely about the question at hand. I intentionally allowed participants to share as much

information as they wanted about a question to include going off topic to glean insights from unintended opportunities.

Data Analysis

I read each raw interview transcript after collecting the data at North Fort Hood, Texas with the Houston Mission Training Center (MTC) personnel. Next, I transcribed each raw interview transcript into digital format using Microsoft word. Once all of the data was transcribed to digital format, I printed the interviews off and re-read them for clarity. Subsequently, I placed the participants into three separate groups based on their past simulation experience and knowledge of DXTRS. Once finished, I re-read the transcripts again focusing on understanding. I also made note of phrases that I didn't expect or comments that stuck out in some way. After reading through the documents a third time, I carefully read them again focusing on coding the transcripts to provide better analytical context. For coding, I used a combination of my own codes in conjunction with TAM2 variables. After I coded each transcript, I identified 42 themes amongst the transcripts. After identifying the themes, I searched for similarities and connections between the categories as well as collectively. Through this process, the themes reduced from 42 to 11. The 11 remaining themes were further analyzed and divided into two groups. Group one serve as the overarching themes of the research while group two addresses items more relevant for future research. The following subsections addresses the findings from the research as well as the themes. The future research items are covered in chapter seven.

Findings

As discussed in chapter four, the interview questions were designed using the TAM2 variables. Each interview question was designed to capture responses from the participant that addressed the specified TAM2 variables. Despite the efforts made to address specific variables from the TAM2 in the interview questions, the responses from the participants in most cases did not transpire as expected. Through additional analysis I also found that question 8 was the only question from the interview that participants responded as expected according to its TAM2 variable. 6 out of 10 participants codes matched across all three categories of participants. It was the highest collective number of responses in the survey. Furthermore, questions 2,3 and 7 all had responses that each had collective responses from 5 of 10 participants.

Throughout data analysis it was evident that the participants did not associate version numbers with simulations. They simply refer to it as DXTRS. As a result, data collection was confounded because the intent was to specifically talk about DXTRS version 1.06 with the understanding that comments about JDLM would occur since it was the main simulation for the exercise. Similar to the interview questions themselves, what was expected to happened did not happen. This could be because the participants were not worried about which version supported the exercise as long as it performed as expected and didn't impede training. The only time the version was understood by the participants was when they referenced a version that didn't work (version 1.06) and their MTC personnel had to change versions to continue mission

Question 8 asked participants if they would recommend DXTRS version 1.06 with its current capability for logistics training in the future. 6 of 10 participants answered "no" to the question and cited its lack of capability as the reason why they would not use it as currently designed. The

lack of capability reflects DXTRS insufficient logistics tracking, convoy capability and lack of consumption data.

Question 2 specifically addressed using DXTRS version 1.06 for logistics training. 5 of 10 responses mentioned performance issues as a reason that they did not use DXTRS version 1.06 for training. For example, one of the participants stated “It didn’t work properly with JDLM and CPOF, so we reverted back to the previous version”. Though the previous comment addresses a non-standard use case for DXTRS, it influenced DXTRS version 1.06 perceived usefulness. It didn’t perform as expected. As stated several times throughout the document, organizations used DXTRS version 1.04 to continue their training and in many cases answered their interview questions based on their experience with both systems. It is still unknown whether there are significant issues with DXTRS version 1.06 or if the local organizations DXTRS configuration at the time of use impacted the proper implementation of DXTRS version 1.06.

Question 3 focused on DXTRS version 1.06 as a replacement for JDLM. 5 of 10 respondents collectively responded with comments that aligned with the subjective norm TAM2 variable. The subjective norm comment refers to the use of DXTRS as a “supporting” system without ever attempting to utilize it as a standalone system first to see if its new logistics function provided the capability needed for logistics training. In the specified use cases, DXTRS is essentially a replacement for JCATS. It is an understandable use of the system when considering the fact that JCATS and the ERF were removed from the conventional Army’s inventory with a few exceptions. In the end, something had to replace JCATS’ flexibility and low cost training. On the other hand, DXTRS was mentioned as having meager logistics functionality and that it does not provide the capability needed to stress a sustainment unit, however, only one participant actually

used DXTRS version 1.06 as a standalone system to test its capability. It seems that there is not a desire to use DXTRS as a standalone system as evident by the response "We don't use DXTRS as a standalone system". It appears that organizations are doing what is expected and using DXTRS version 1.04 or 1.06 because "it works" with JDLM and CPOF. It is likely that DXTRS will not be used as a standalone logistics training tool as long as JDLM is available.

Question 7 spoke to the ease of use of DXTRS version1.06. Although the responses were mostly the result of DXTRS version 1.04, DXTRS is viewed as an easy to use system. Responses such as " we love how easy it is to use" and "I downloaded it with my CAC" all speak to DXTRS's accessibility and ease of use. Ironically, the ease of use does not translate to actual system usage as a standalone system.

Discussion

The iterative inductive thematic content analysis process resulted in identifying 11 themes. The four overarching themes identified during my analysis are: DXTRS in the background, Training Quality, Use Case Update and Limited Capability. The themes are discussed in greater detail throughout the remainder of this chapter.

DXTRS in the Background

A very common theme amongst almost every interview conducted was DXTRS use as a supporting system. In several of the responses provided, DXTRS was primarily used as a background simulation capability that passed data between other systems such as CPOF and JDLM. Comments such as "It's tough to measure DXTRS performance because it's not used as

a standalone system" or "I wished we used it more as a standalone system instead of as a supporting system" identifies the fact that for the near future it is likely that DXTRS will remain a supporting system. A byproduct of DXTRS's usage as a supporting system is that users had limited knowledge of version 1.06 capabilities. Given that many of the responses responded to the interview questions with DXTRS version 1.04 in mind, it is possible that the true analysis of DXTRS version 1.06 as a standalone system has not been done. Lastly, DXTRS use as a supplementary system has led to limited acceptance amongst the participants. Statements such as "I would use DXTRS version 1.06 for logistics training, IF, it is used the way it was during our exercise with JDLM" and "It's not good enough to do logistics without JDLM but the pair makes a great team". From this perspective, access to JDLM for sustainment training is comparable to having a player such as Michael Jordan or Lebron James on your team with teammates such as Scottie Pippen or Kyrie Irving. Both Pippen and Irving are great on their own merit but will never truly get the credit they deserve in the shadows of the superstars. In this case, JDLM is the Michael Jordan or Lebron James of sustainment training systems at the moment and DXTRS is a teammate waiting to fill Scottie Pippen or Kyrie Irving's role. This phenomenon will only change if and when JDLM is no longer accessible for sustainment training and DXTRS logistics capabilities are enhanced.

This theme also relates to the TAM2 subjective norm variable. Similar to the sentiments shared above about question 3, organizations are used to using DXTRS as a supporting system despite the version. It is now status quo to use DXTRS, JDLM and CPOF together to maximize training and cost for the supported unit. Comments such as "we're comfortable using 1.04 with JDLM and CPOF" not only shows that there's not much desire to change DXTRS versions but

also that there's likely not a chance to use DXTRS as a standalone system. Using DXTRS as a standalone almost appears to be a taboo use case for the system when in fact it was designed to be used as such. Akin to the subjective norm TAM2 comparison, it is likely that the use of DXTRS as a supporting system does not draw attention to the technical applications for a given exercise while using it as a standalone system might draw additional questions from the training unit or higher command.

Training Quality

Training Soldiers is a serious task because they rely on their training for optimal performance in combat. As a result, the training quality of logistics Soldiers cannot be compromised as identified by several participants. Comments such as "Our customers need JDLM to support their CASCOM provided training packages for the CPX-F" or "DXTRS does not provide enough consumption data to drive decision making, to remedy the issue JDLM is used". The statements included above show that in the Army JDLM is still the preferred tool for sustainment training because it supports the CASCOM approved CPX-F products. It also provides the consumption data needed for commanders to make decisions. Figure seven below shows the limited logistics data provided by DXTRS.

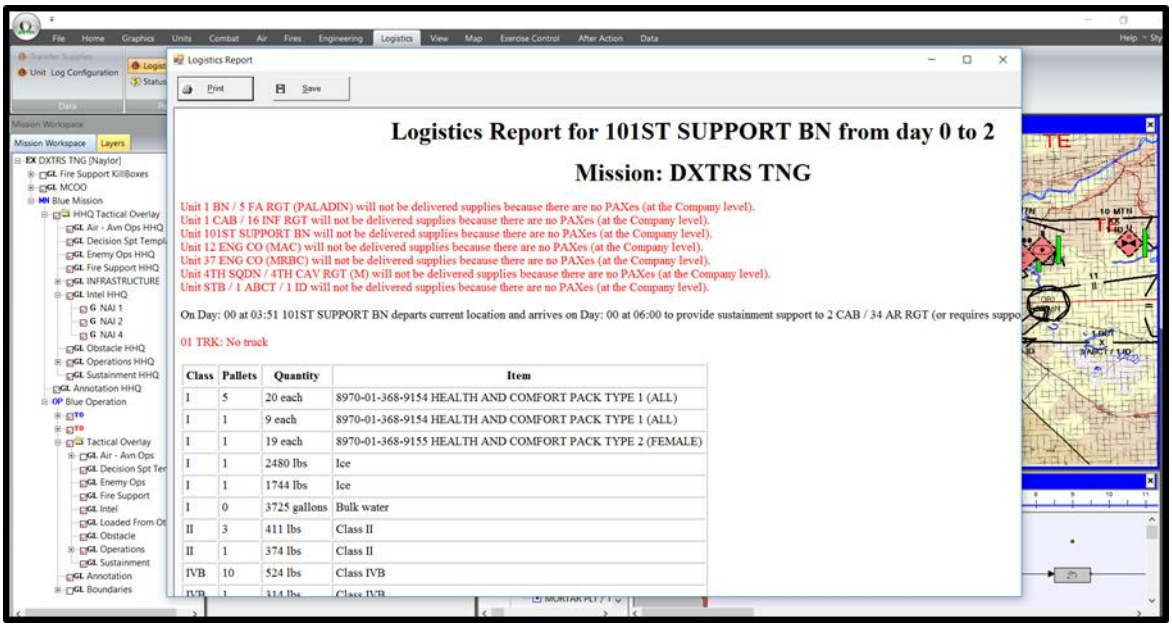


Figure 7. DXTRS Logistics Data

The logistics report above provides a very basic capability to the unit commander. The report could be used to conduct a STAFFEX but there is not enough information in terms of consumption rates and unit specific information to plan resupply. The report shown lacks the detailed data that a commander expects and need to make timely decisions.

The training quality theme relates to the TAM2 output quality variable. Output quality is identified within this study through numerous statements such as “it can’t be used solely as a logistics trainer in its current capability”. The aforementioned statement addresses the fact the DXTRS output quality does not meet the expectations of its customers and it is doubtful that it can match their perceived training quality goals. It is great that there is still a great product such as JDLM to continue to train sustainment Soldiers. Will DXTRS reliance or use with JDLM change the need to replace JDLM? It is improbable that JDLM will be retained based on its usage with DXTRS, however, CASCOM’s CPX-F’s training packages are primarily dependent on using JDLM as the simulation system.

Limited Capability

Currently, DXTRS provides the ability to move supplies from one location to another using a unit icon on a map. However, unit commanders prefer to see convoys in transit on the map. Statements such as "Logistics reporting and convoys need to be improved" or "DXTRS need convoy movement capability" identify the requirements that users expect from their sustainment training systems. Figure eight below provides an example of DXTRS current logistics tracking and convoy capability. The logistics unit outlined in red is the "supporting" unit delivering supplies to its "supported" unit. The logistics transaction does not show vehicles traversing supply routes to deliver supplies to its customers. It is important to note that while DXTRS convoy capability is lacking, it does provide enough functionality to conduct basic logistics planning.

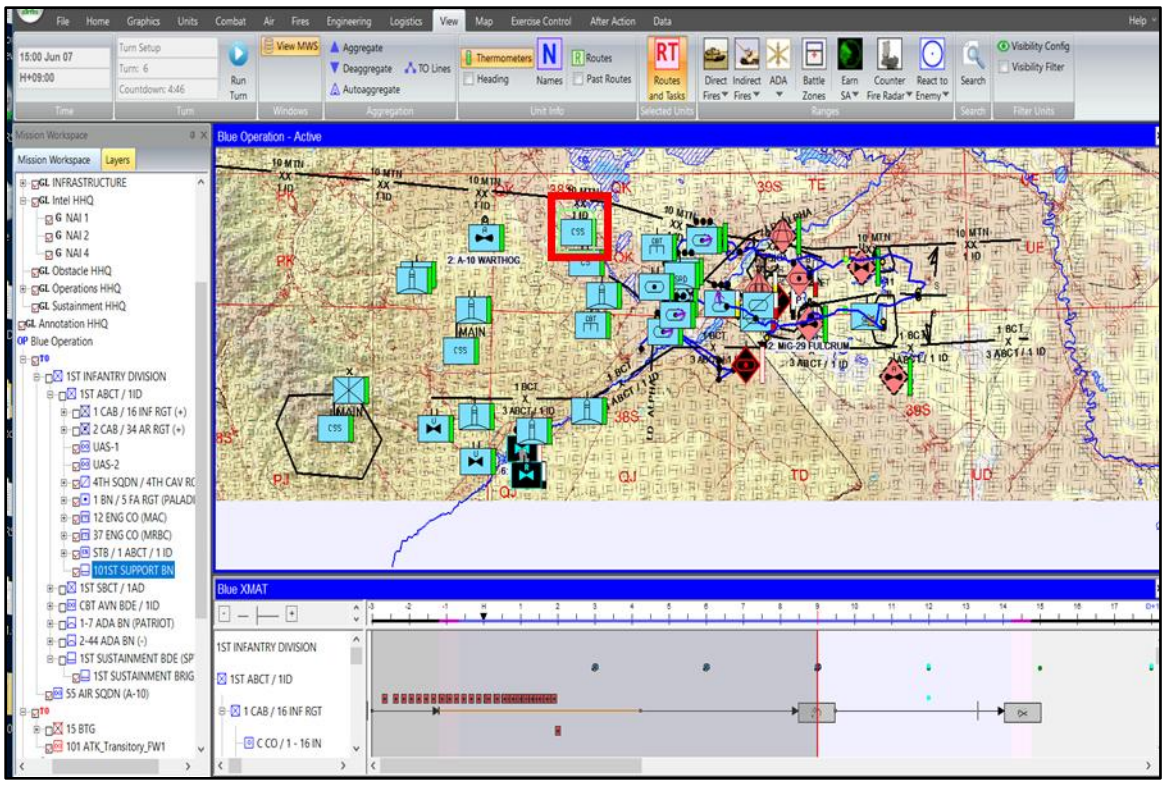


Figure 8. DXTRS Logistics Tracking

Overall, DXTRS performance based on the feedback from the surveys was inadequate to serve as a primary logistics training tool. A participant stated "I attempted to use DXTRS for a previous exercise, but it did not work as a gateway from JDLM to CPOF". In one instance, DXTRS V 1.06 was not able to support training with JDLM and CPOF and resulted in the MTC using version 1.04. For that exercise, DXTRS v1.04 was used to pass information from JDLM to CPOF which gave the training audience better in transit visibility of logistics assets. In this capacity, DXTRS merely served as a supporting asset to JDLM and CPOF and the training audience likely had little knowledge that the system was used.

The limited capability theme for this study links to TAM2's perceived usefulness. DXTRS version 1.06 performance as a result of its limited capability affects its perceived usefulness as a sustainment training solution. As a result, the older version is used in lieu of version 1.06. The

perceived usefulness of the system ultimately affects system usage. According to the responses from the study participants, DXTRS version 1.06 "actual" system usage as a standalone or supporting system is minimal.

Use Case Update

Throughout this study it is undeniable that DXTRS' primary usage is to support JDLM in conjunction with CPOF. Though this combination seems to produce adequate results, it is not a typical use case for the system. The use of DXTRS as a supporting system linking JDLM and CPOF seems to be an emerging use case for DXTRS. As a result, a new "logistics" use case should be added to DXTRS documentation to formally recognize this emerging use case. This use case also ties into a future research opportunity discussed in the ensuing chapter seven. Additionally, despite its usage as a supporting system, DXTRS is continuing to increase its role in the academia of the Army. One of the participants stated "we are preparing for DXTRS version 1.07 release and developing our support plan for a new Command and General Staff College (CGSC) requirement. They are going to start using DXTRS for the Military Decision Making Process (MDMP) and staff training." This is great news in that it shows that there's still perceived usefulness of DXTRS' for its original use case as a staff training tool. MDMP is an analytical framework used by commanders and staff to aid in effective decision making and planning. MDMP is similar to the seven step decision making model used in an academic or business environment. Appendix S provides an example of the seven step decision making model identified by Neal Litherland (2017) and illustrated by Negulescu (2014) and discusses its similarity to the Army's MDMP model. Figure nine is an example of the MDMP model used in

the U.S Army. MDMP allows an organization to thoroughly prepare for the given task or mission. During MDMP, several potential solutions (courses of action) are identified and analyzed (course of action analysis). The best option among the potential solutions is selected to accomplish the task or mission at hand (course of action approval). Following the selection of the solution, the organization creates a comprehensive plan (operations order production) that outlines the responsibilities for all subordinate staff members and organizations.

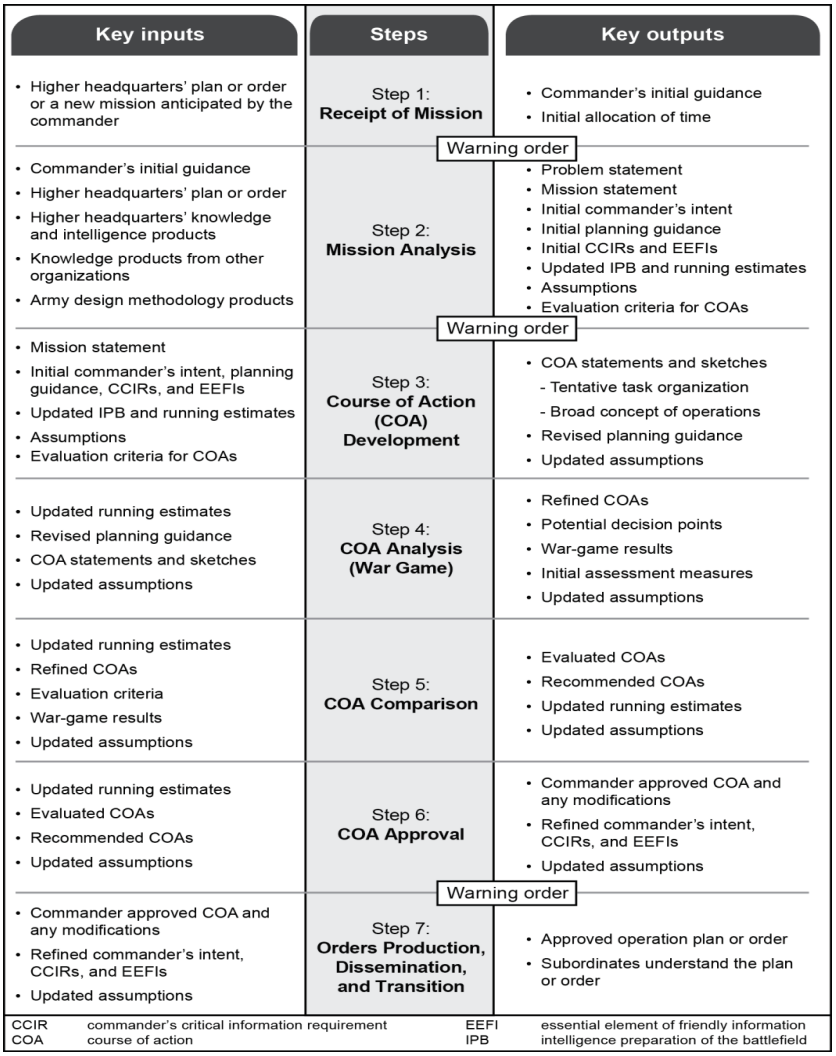


Figure 9: Military Decision Making Process

Source: FM 6-0, 2016, p.9-3.

This study was originally designed to show the linkage between the TAM2, NASA-TLX and DXTRS acceptance and suitability as a sustainment training tool. Despite the intended associations of the aforementioned methodologies, this study as executed only validated the overall acceptance of DXTRS in the field. More specifically, DXTRS version 1.06 as described in the study was not accepted well amongst the force considering the connection issues with JDLM and CPOF. This study provided a linkage to some of the TAM2 variables but a connection to the NASA-TLX was not possible and therefore leaves a void in the results on this study based on the original design. Testing of DXTRS during a constructive training exercise is required to formally evaluate the performance and task load variables as they pertain to the NASA-TLX.

Table eight outlines some general factors that can limit the use of a simulation system for training. I assessed the capabilities of each system as they relate to the factors described in the far left column of the table. The boxes shaded red identify a gap or insufficient capability for the given system for the factor being analyzed. In terms of acceptable logistics functionality both JDLM and WARSIM provide enough capability to conduct a logistics training exercise. In terms of interoperability all of the systems have some capability to interoperate with other systems to enhance training. The training cost and ease of use factors favors both DXTRS and JCATS because of the relatively low cost to conduct training exercises with the systems and the ease of use to train Soldiers on the systems in relation to JDLM and WARSIM. The after action review (AAR) factor favors three of the listed systems and simply indicates that those systems possess the ability to use data from a training exercise to drive an AAR discussion. Lastly,

accessibility favors DXTRS because it is the easiest of all the listed systems to access and use for training. As indicated in table eight, DXTRS has a lot of factors that it possess, however, it has a significant void in the logistics functionality category due to its inability to display convoys and provide data consumption. DXTRS lack of logistics tracking and data consumption was the most substantial factor that contributed to the broken linkage between the data I expected to collect during the study and the data that I actually collected.

Table 8: Simulation Analysis

Factors	**System**			
	DXTRS	JCATS	JDLM	WARSIM/ WARSIM-B
Logistic Functionality (incl. convoys, data consumption)			x	x
Interoperability	x	x	x	x
Training Cost	x	x		
Ease of Use	x	x		
AAR Capability	x	x		x
Accessibility	x			

CHAPTER SEVEN: CONCLUSIONS, RECOMMENDATIONS AND SUGGESTED FUTURE RESEARCH

This chapter summaries the research, presents conclusions, and provides recommendations for future research based on interview responses from the three unique groups of participants used for this study. The future research areas are provided from the group as a collective and not as individual categories.

The loss of BCS3 and JCATS as constructive training options along with the pending replacement of JDLM created a need for a new constructive logistics training option in the Army. With the loss of BCS3, the Army lost a dual purpose logistics system capable of use in both the operational and training environments. Furthermore, JDLM's pending replacement exacerbates the need for a constructive simulation that is capable of stimulating logisticians during constructive training exercises. Although a date for JDLMs replacement has not been publicly released, it is essential that an additional training option is utilized prior to its departure. Currently, DXTRS 1.04 is used as a supporting tool to JDLM to provide sustainers a low cost training option to WARSIM and also offers the logistics information needed to adequately stimulate logisticians during constructive training exercises. However, the Army needs a new standalone training tool for logistic staff training. Two broad research questions were identified at the start of this study. They are: Is DXTRS suitable to help maintain sustainment proficiency through training? Secondly, how might one assess the suitability of DXTRS to conduct sustainment training? These developed into three specific research questions. They are: Is DXTRS sustainment capability sufficient for training sustainment tasks for brigade and below

organizations? Does the interoperability with JCR and CPOF eliminate the need to manually track logistics operations during training? Does DXTRS logistics reports provide adequate information for staff officers to sufficiently inform the commander and populate the COP during training? Finally, research limitations forced abandonment of a survey methodology conducted during exercises. Instead an interview methodology emphasizing inductive thematic analysis was adopted and applied based on TAM2, but not NASA-TLX. Ten individuals were interviewed drawing from three categories – four from command, three from expert, and three from novice. Conclusions, Recommendations, and Future Research stemming from that research follows.

Conclusions

As this study presents there are few constructive simulations to train logistics within the Army. This study identified the need and provided a solution for an additional constructive simulation to train logistics. This thesis makes the case that DXTRS is still a useful training tool. More specifically, it can be an adequate logistics training tool if it's capabilities are improved. As identified by the TAM2, actual system usage of DXTRS was impacted by both social influence and cognitive variables. Based on the results of this study, DXTRS 1.06 needs to be used and evaluated as a standalone system to truly determine if it is suitable as a sustainment training solution. Though many of the interview responses indicate that it is not, those responses are largely based from version 1.04. While the increased use of DXTRS paired with JDLM and CPOF is not a specified use case of the system, such use should continue in an effort to provide logistics Soldiers the best training available. As training opportunities arise, DXTRS 1.06 should be considered to test its capability in an actual training exercise and aid in further development of the system. Lastly, the sustainment community is eagerly awaiting the future sustainment mission command system to replace BCS3. Though this research does not seek to provide a

solution to replace BCS3, comments about the void it left during this study was inevitable. One of the respondents stated " We still need a system we can use down range and get away from manual solutions". Though the scope of the comment was limited, the sentiments are understood throughout the sustainment community as sustainment Soldiers continue to use manual solutions to track equipment and supplies both operationally and during training.

Recommendations

The recommendations provided in this section focus on addressing the major issues identified throughout this study based on the feedback from participants. The overall acceptance of DXTRS as a system seems favorable whether it is as a standalone or supporting system. As a result, my recommendations below focus on improving the use and capability of the system.

Improve DXTRS Logistics Capability

I recommend that the ALOTT/DXTRS program manager (PM) continue to work with CASCOM located at Fort Lee, Virginia to improve the systems logistics capability. Achieving a "good enough" sustainment training solution give commanders a cheaper and more flexible option than training with WARSIM-B. Some thought and analysis must be done to determine what "good enough" is for DXTRS logistics functions but it most likely will not include the full capability provided by JDLM or BCS3 but can significantly improve from where it is today.

Test DXTRS Training Capability

The Army is continuing to improve its technological capability and DXTRS must keep up with it. The improved capability of DXTRS must include testing and improving DXTRS' interoperability with more mission command systems. The increased interoperability will also add to the systems perceived usefulness and possibly increase its overall usage beyond a supporting system to JDLM. Additionally, DXTRS' interoperability must be tested within the JLCTCC MRF. Confirming DXTRS' interoperability with JDLM and CPOF in the JLCTCC MRF potentially provides Army commanders an opportunity to train using the approved JLCTCC federation. Unlike the training conducted with DXTRS in the JLCTCC ERF, training in the MRF can be improved upon and archived for future use by other units.

Use DXTRS for MDMP

DXTRS main use case is to support staff planning as it pertains to MDMP. Given that the system began in the institutional environment to train MDMP it is appropriate to continue that use case at both the unit level and institutional environments. As noted earlier, CGSC will soon begin using the system. As for the unit level usage, Soldiers are at least open to using the system as a staff planning tool as indicated by the response *"DXTRS is a good training tool for a STAFFEX for a battalion and below unit".* Moreover, it can potentially eliminate the need to transfer graphics from different platforms as well as other operational information in preparation

for a training exercise. The graphics can be created on DXTRS and displayed on the CPOF to provide a COP during the simulation exercise.

Future Research

Methods for training with the system as a standalone system as well as a supporting system were described in chapters six and seven of this thesis. Future work on a new use case for DXTRS that includes its usage paired with JDLM. This solution would essentially eliminate the need to add additional logistics capability to DXTRS and pair it with JDLM as a longer-term solution. Additional analysis should consider the cost of maintaining JDLM's license to use with DXTRS versus the cost of adding additional capability to enhance DXTRS' performance. A second future research area should focus on DXTRS' role as it pertains to the future command post computing environment (CP CE). CP CE is expected to provide an integrated, interoperable, cyber-secure computing environment for all Army systems within the command posts to operate (Pomerleau, 2017). As a result, future research with DXTRS should be done to determine if it meets the requirements to operate within CP CE. Research should be conducted on the feasibility of connecting DXTRS to GCCS-A through a cloud application for training. This gives the system additional logistics capability that is accessible from anywhere. Lastly, recommendations and suggestions for future research were provided to increase DXTRS logistics capability and training usage to provide a better logistics training solution for Army Soldiers.

APPENDIX A: DXTRS LOGISTICS SIMULATION EXPECTATIONS

This appendix describes the categories and unit levels of logistics functionality expected for a simulation to stimulate Army sustainment units as well as the features included in DXTRS v1.06. Table A1 outlines the basic logistics expectations derived from both CATS and AUTL. However, the requirements listed below do not originate from acquisition documents. Table A2 outlines the improved logistics and operations features of DXTRS.

Table A1: Required Categories of Logistic Functionality

DXTRS Logistics Simulation Expectations	**Unit Level of Functionality**				
Category of Logistics Functionality	CO	BN	BDE	DIV	Corps
Personnel	x	x	x	x	x
Ammunition	x	x	x	x	x
Fuel	x	x	x	x	x
Supplies (I,VII)	x	x	x	x	x
Medical	x	x	x	x	x
Maintenance	x	x	x	x	x
Transportation*****					
Other Required Functions					
Consumption Data	x	x	x	x	
Data Visualization	x	x	x	x	
Interoperable with Mission Command (MC) systems	x	x	x	x	

* Basic transportation functionality exists but must be improved to show convoys conducting logistics operations

Table A2: DXTRS v1.06 Logistics and Operations Features

Logistics (Sustainment) Updates	
Class III (Fuel)	
	Restrictive fuel settings (No fuel/ no move; no fuel/ no fight)
	Updated fuel parameters (CASCOM data)
Class V (Ammunition)	
	Restrictive ammo settings (no ammo/ no shoot)
	Close Combat consumption model for ammo (Corps, Division, BDE & below)
Logistics Operations	
	System generated log levels for a mission from unit composition
	Improved log status through:
	Unit Tooltips
	Unit Current Status
	Current Log Status
	Unit Log Configuration
	Improved log behaviors (Corps, Division, BDE & below)
	Manual resupply between units
Other Operational Enhancements	
	Automatic Survivability moves for Artillery units
	Includes an Engineering Ribbon
	Rheostat control to dial up/down fuel and ammo consumption rates
	Rheostat control to dial up/down attrition rates
	Combat Message enhancements
	Definition of key platforms within each unit via Status Portal
	DDS enhancements:
	Import Graphics
	Manage subscriptions
	Improved performance and support for Corp level multi-day exercises
	Student Quick Reference Guide
	Exercise Manager Quick Reference Guide
This information was extracted from: https://milgaming.army.mil/Entrance/News.aspx?PID=17&id=251 on 17June 2018 by TJ Naylor.	

APPENDIX B: ARMY TRAINING TASK EXAMPLE

This appendix describes Army training tasks as outlined in Army Doctrine Reference Publication (ADRP) 1-03: The Army Universal Task List (AUTL), and the Combined Arms Training Strategy (CATS). The AUTL describes broad tasks meant for capability development, integration functions and training development. Commands and staffs use CATS to plan and evaluate training. Table B1 outlines the AUTL tasks. Table B2 outlines the CATS tasks.

Table B1: Army Logistics AUTL

The Army Universal Task List: Army Tactical Task (ART) 4.0 Sustainment Warfighting Function	
ART 4.1	Provide Logistics Support
4.1.1	Provide Field Maintenance Support
4.1.2	Provide Transportation Support
4.1.3	Provide Supplies
4.1.4	Provide Field Services
4.1.5	Provide Operational Contract Support
4.1.6	Provide Distribution
4.1.7	Provide General Engineering Support
ART 4.2	Provide Personnel Support
4.2.1	Provide Human Resources Support
4.2.2	Provide Financial Management Support
4.2.3	Provide Legal Support
4.2.4	Provide Religious Support
4.2.5	Provide Band Support
ART 4.3	Provide Health Service Support
4.3.1	Provide Combat Casualty Care
4.3.2	Provide Medical Evacuation
4.3.3	Provide Medical Regulating Support
4.3.4	Provide Medical Logistics
Information extracted from ADRP 1-03 October 2015	

Table B2: Army CATS Example

Army Airborne Infantry Brigade Support Battalion (BSB)(Missiion Essential Task List (METL)		
55-BN-4800		**Conduct Expeditionary Deployment Operations at the Battalion Level**
	55-BN-4804	Conduct Deployment Activities at the Battalion Level
	55-BN-4805	Conduct Predeployment Activities at the Battalion Level
	55-BN-4878	Conduct Redeployment Activities at the Battalion Level
	55-EAC-4851	Coordinate Installation/Garrison Support at Echelons above Corp
	55-EAC-4862	Coordinate Onward Movement
	55-EAC-4873	Plan Deployment at the Echelons Above Corp Level
	71-BN-5100	Conduct the Mission Command Operations Process f
63-BN-0727		**Conduct Actions Associated with Area Defense during Offensive, Defensive, Stability and Defense Support of Civil Authorities (DSCA) Operations**
	03-SEC-9007	Coordinate CBRN Protection
	55-BN-0055	Plan Tactical Convoy During Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-2805	Conduct Battalion Base Cluster Operations during Offensive, Defensive, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4012	Plan Battalion Area Tactical Operations
	63-BN-4013	Plan Battalion Base and Base Cluster Operations
	63-EAC-2702	Coordinate Movement of Subordinate Sustainment Units
	71-BN-5100	Conduct the Mission Command Operations Process for Battalions
63-BN-1028		**Conduct Sustainment Support in an Area Defense**
	63-BN-4019	Direct Establishment of Subordinate Units and Headquarters Elements in Support the Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4028	Conduct Sustainment Operations in Support of Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4032	Coordinate LOGPAC Operations
	63-BN-4033	Conduct Transportation Support
	71-BN-5100	Conduct the Mission Command Operations Process f
63-BN-1072		**Conduct Sustainment Support in a Movement to Contact**
	63-BN-4019	Direct Establishment of Subordinate Units and Headquarters Elements in Support the Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4028	Conduct Sustainment Operations in Support of Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4032	Coordinate LOGPAC Operations
	63-BN-4033	Conduct Transportation Support
	71-BN-5100	Conduct the Mission Command Operations Process for Battalions
63-BN-1092		**Conduct Sustainment Support in an Attack**
	63-BN-4019	Direct Establishment of Subordinate Units and Headquarters Elements in Support the Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4028	Conduct Sustainment Operations in Support of Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4032	Coordinate LOGPAC Operations
	63-BN-4033	Conduct Transportation Support
	71-BN-5100	Conduct the Mission Command Operations Process for Battalions
63-BN-1272		**Conduct Sustainment Support in Area Security**
	63-BN-4019	Direct Establishment of Subordinate Units and Headquarters Elements in Support the Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4028	Conduct Sustainment Operations in Support of Offense, Defense, Stability and Defense Support of Civil Authorities (DSCA) Operations
	63-BN-4032	Coordinate LOGPAC Operations
	63-BN-4033	Conduct Transportation Support
	71-BN-5100	Conduct the Mission Command Operations Process for Battalions
Information derived from US Army Training Network Portal Combined Arms Training website on 19June2018 https://dtms7.army.mil/ATNPortalUI/METL/# by TJ Naylor		

APPENDIX C: KNOWN DXTRS USAGE LOCATIONS

This appendix shows the known locations that use DXTRS for training.

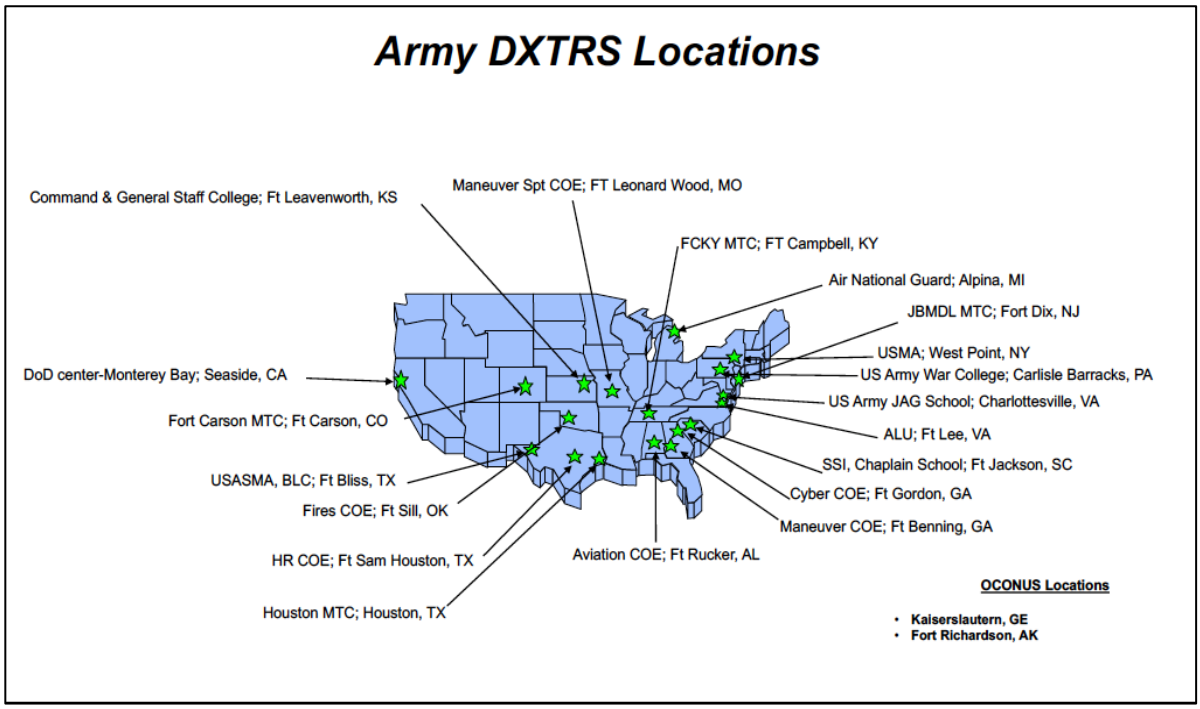


Figure C1: DXTRS Training Locations
Source: ALOTT (DXTRS) support team at the U.S Army National Simulation Center Fort Leavenworth, Kansas 18 June 2018.

APPENDIX D: DEMOGRAPHIC SURVEY

Participant #:
Section I: Demographic Information
Gender
1. Male
2. Female
Age
1. 25-30
2. 31-35
3. 36-40
4. 41-50
5. 50+
Rank
1. O3
2. O4
3. O5
Time in Service (Experience)
1. 3 years
2. 4-7 years
3. 8-14 years
4. 15 + years
Branch/MOS
1. Operations (AD, AR, AV, CA, CM, EN, FA, IN, MP, PO, SF)
2. Combat Support (MI,SC, FA's: 26,34,40,46,47,48,49,50,52,57,59)
3. Force Sustainment (AC, AG, FI, LG)
Simulation Experience
Have you ever used a constructive simulation before (ex. DXTRS, JCATS, WARSIM,CBS)**?**
1. I have never used a constructive simulation
2. 1-2 times
3. 3-5 times
4. 5 or more times
Have you ever used DXTRS as part of a training exercise?
1. I have never used DXTRS
2. 1-2 times
3. 3-5 times
4. 5 or more times

Have you received formal DXTRS operations training?
1. Yes
2. No
Have you received informal training on how to operate DXTRS? (ex. self-training, YouTube etc.)
1. Yes
2. No

APPENDIX E: TAM SUITABILITY SURVEY

Participant #:			
Section II: Perceived Usefulness (PU)		**Survey Scale:** 1= Strongly Disagree 2=Somewhat Disagree 3= Disagree 4=Neither agree nor disagree 5= Somewhat Agree 6= Agree 7= Strongly Agree	
Section IIa: Subjective Norm (SN)			
1	My chain of command supports the use of DXTRS for training.	SN1	1 2 3 4 5 6 7
2	My peers supports the use of DXTRS for training.	SN2	1 2 3 4 5 6 7
3	Conducting training with DXTRS is required in my organization.	SN3	1 2 3 4 5 6 7
Section IIb: Image (I)			
4	DXTRS is perceived as an effective training tool in my organization.	I1	1 2 3 4 5 6 7
5	Using DXTRS for training will make my chain of command happy.	I2	1 2 3 4 5 6 7
6	I will be more successful in my organization if I use DXTRS for training.	I3	1 2 3 4 5 6 7
Section IIc: Job Relevance (R)			
7	DXTRS improves my job performance.	R1	1 2 3 4 5 6 7
8	I find DXTRS useful for my organization.	R2	1 2 3 4 5 6 7
Section IId: Output Quality (O)			
9	DXTRS interoperability with CPOF is effective.	O1	1 2 3 4 5 6 7
10	Reports provided by DXTRS is appropriate to populate the commanders COP.	O2	1 2 3 4 5 6 7
11	Overall, I believe DXTRS offers sufficient sustainment functionality for sustainment training.	O3	1 2 3 4 5 6 7
Section IIe: Results Demonstrability (RD)			
12	I believe DXTRS enhances my organizations training.	RD1	1 2 3 4 5 6 7
13	Using DXTRS improves my organizations sustainment proficiency.	RD2	1 2 3 4 5 6 7
14	I believe that DXTRS enhances my job performance.	RD3	1 2 3 4 5 6 7
Section III: Perceived Ease of Use (E)			
15	I feel that using DXTRS would be easy for my subordinates.	E1	1 2 3 4 5 6 7
16	It would be easy for my subordinates to become skillful at using DXTRS.	E2	1 2 3 4 5 6 7
17	My ability to determine the ease of use of DXTRS is limited to my lack of experience.	E3	1 2 3 4 5 6 7
Section IV: Intention to Use (IU)			
18	I plan to use DXTRS for sustainment training in the future.	IU1	1 2 3 4 5 6 7
19	Assuming I have access to DXTRS for sustainment training, I intend to use it.	IU2	1 2 3 4 5 6 7

Section V: Feedback	Please provide feedback below on the usefulness of this survey.

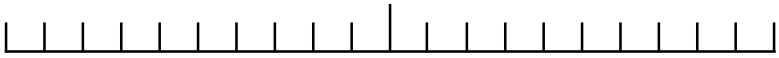
APPENDIX F: NASA-TLX SUITABILITY SURVEY

Participant #: Task: Date:

Mental Demand How mentally demanding was DXTRS?

Very Low Very High

Temporal Demand How hurried or rushed was the pace of the task?

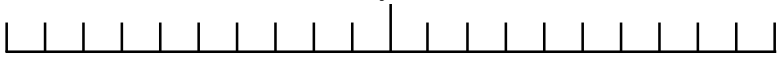


Very Low Very High

Effort How hard did you have to work to accomplish your level of performance?

Very Low Very High

Performance How successful were you in accomplishing what you were asked to do?



Perfect Failure

Frustration How insecure, discouraged, irritated, stressed, and annoyed were you?

Very Low Very High

* This survey is a modified version of the NASA Task Load Index (TLX)

APPENDIX G: PERFORMANCE SURVEY

Participant #:				
Section VI: DXTRS Performance Survey			**Survey Scale:** 1= Strongly Disagree 2=Somewhat Disagree 3= Disagree 4=Neither agree nor disagree 5= Somewhat Agree 6= Agree 7= Strongly Agree	
Section VII: Logistics Tracking				
20	DXTRS provides accurate units of measure for supplies.	LT1	1 2 3 4 5 6 7	
21	I was able to select units within my task organization to track logistics.	LT2	1 2 3 4 5 6 7	
22	Initial logistics levels were sufficient and matched my unit composition.	LT3	1 2 3 4 5 6 7	
23	I was able to conduct manual resupply amongst subordinate units.	LT4	1 2 3 4 5 6 7	
24	I was able to view the current logistics status of subordinate units.	LT5	1 2 3 4 5 6 7	
Section VIII: Logistics Consumption				
25	My unit's fuel consumption was accurately tracked.	LC1	1 2 3 4 5 6 7	
26	My unit's ammo consumption was accurately tracked.	LC2	1 2 3 4 5 6 7	
27	I was able to drive without fuel.	LC3	1 2 3 4 5 6 7	
28	I was able to shoot without ammo.	LC4	1 2 3 4 5 6 7	
29	I was able to visualize my logistics consumption with DXTRS.	LC5	1 2 3 4 5 6 7	
Section IX: Supply Delivery Accuracy				
Section IXa: Time				
30	My supplies were delivered on time as the mission required.	SDT1	1 2 3 4 5 6 7	
31	Manual resupply amongst units were delivered on time as the mission required.	SDT2	1 2 3 4 5 6 7	
Section IXb: Supply Quantity				
32	My supplies were delivered with the correct quantity.	SDQ1	1 2 3 4 5 6 7	
33	My manual resupply amongst units were delivered with the correct quantity.	SDQ2	1 2 3 4 5 6 7	
Section IXc: Supply Type				

34	My supply request matched the supplies delivered.	ST1	1	2	3	4	5	6	7
35	My manual resupply request matched the supplies delivered.	ST2	1	2	3	4	5	6	7
Section X: Other									
36	DXTRS helped my unit achieve its sustainment training tasks	OT1	1	2	3	4	5	6	7
37	Overall, DXTRS helped my unit achieve its training objectives	OT1	1	2	3	4	5	6	7
Section XI: Additional Feedback		**Please provide additional feedback below as needed.**							

APPENDIX H: INTERVIEW QUESTIONS

Participant #:	

DXTRS Interview Questions

1. What is your current duty position?

2. (**Usage**) Have you used DXTRS v 1.060 for training?

   (RD) If yes, please share your thoughts on how the logistics functions worked?

   (OQ) If no, why didn't you use DXTRS v 1.060?

3. **(Perf/R)** Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

   If no, why (explain using your best judgment based on previous experience)?

4. **(OQ&IU)** Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

   If yes, Can you describe the work or effort required?

   If no, why?

5. **(SN&I)** Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?
6.

   If yes, Is using DXTRS v.1.060 mandatory?

   If no, why?

7. **(E)** Do you think that most organizations would find DXTRS v.1.060 easy to use?

   If no, why?

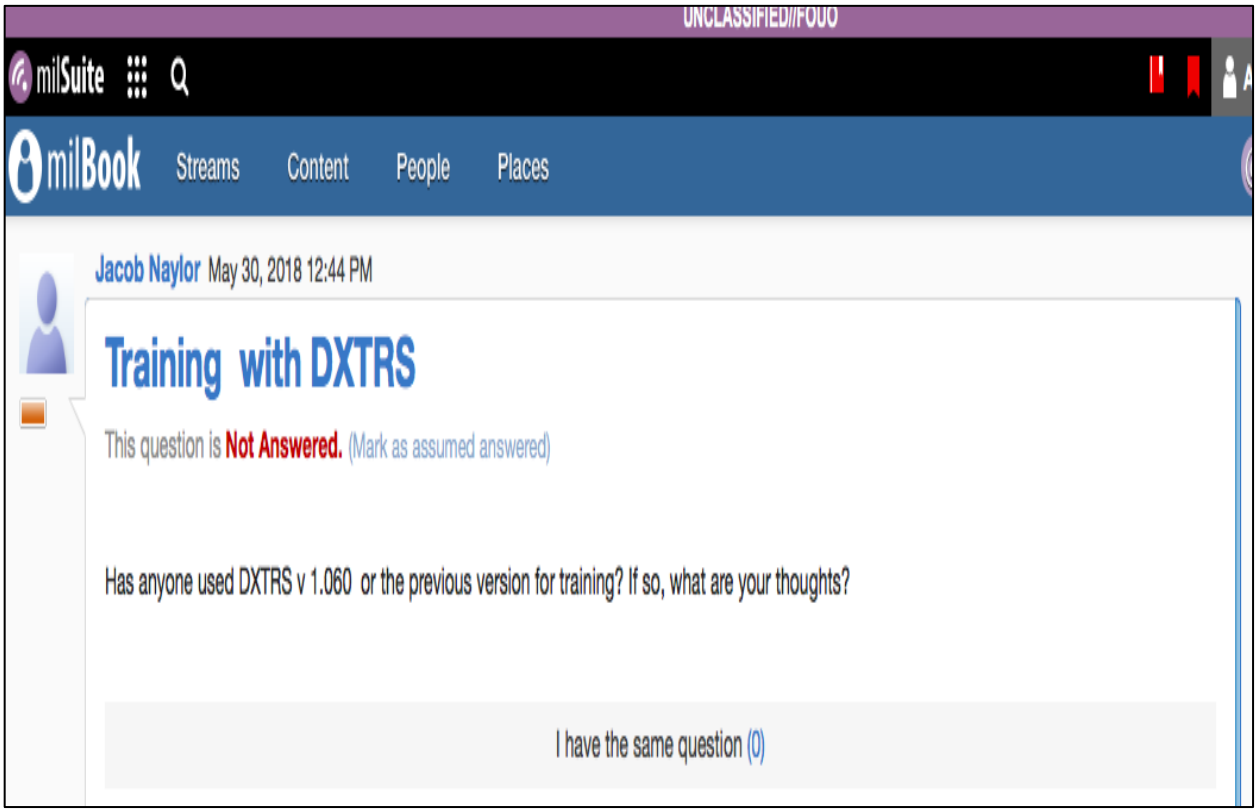
8. **(IU/Perf)** Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

   If no, what improvements would you make?

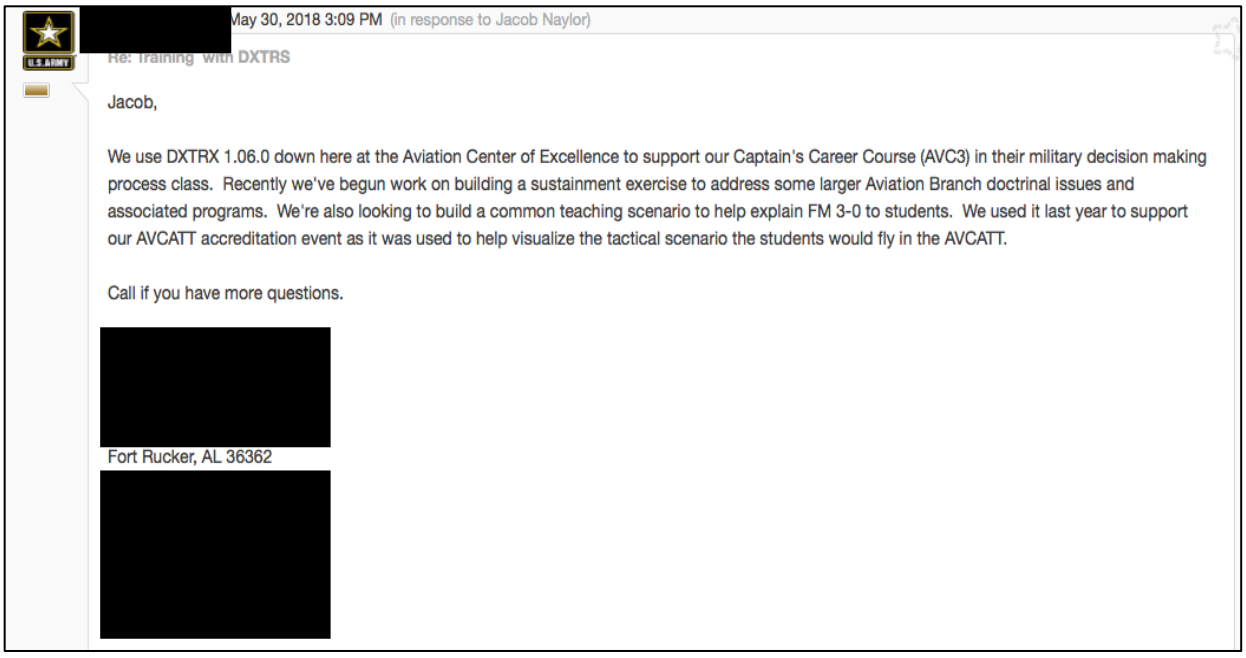
9. Do you have any additional comments about using DXTRS v.1.060 for logistics training?

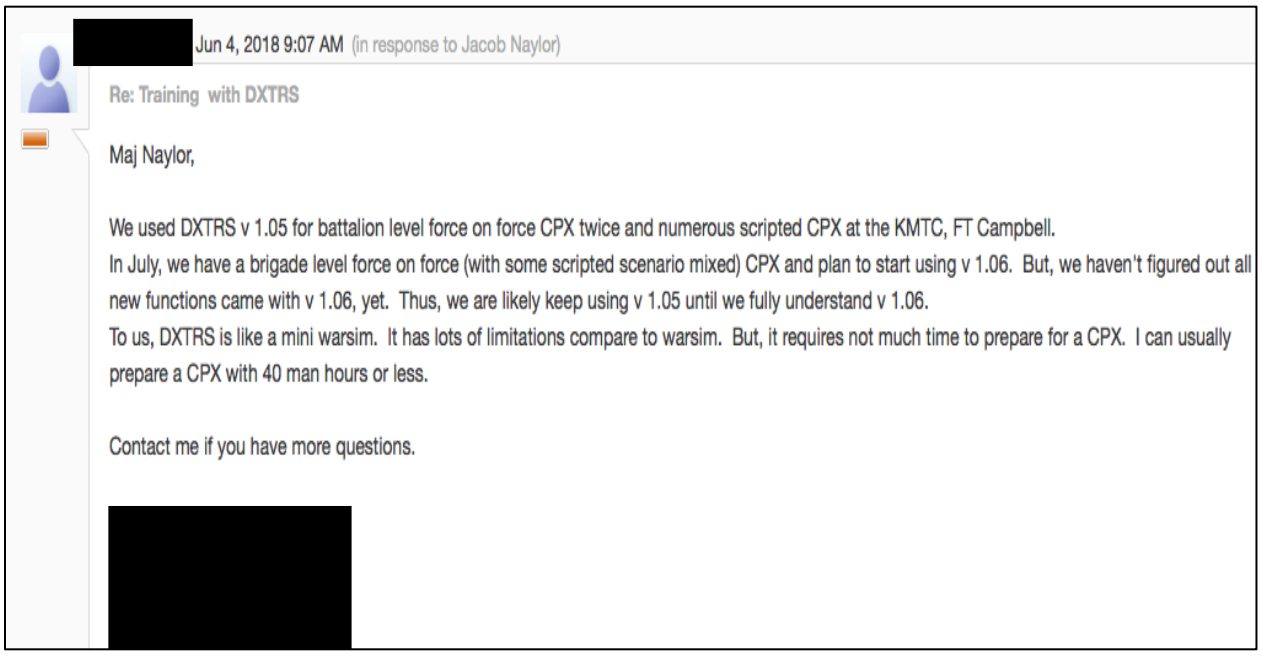
APPENDIX I: DXTRS CORRESPONDANCE

Question:



Responses:





[redacted] Jun 4, 2018 9:07 AM (in response to Jacob Naylor)

Re: Training with DXTRS

Maj Naylor,

We used DXTRS v 1.05 for battalion level force on force CPX twice and numerous scripted CPX at the KMTC, FT Campbell.
In July, we have a brigade level force on force (with some scripted scenario mixed) CPX and plan to start using v 1.06. But, we haven't figured out all new functions came with v 1.06, yet. Thus, we are likely keep using v 1.05 until we fully understand v 1.06.
To us, DXTRS is like a mini warsim. It has lots of limitations compare to warsim. But, it requires not much time to prepare for a CPX. I can usually prepare a CPX with 40 man hours or less.

Contact me if you have more questions.

[redacted]

APPENDIX J: IRB APPROVAL DOCUMENTS

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Jacob Naylor**

Date: **September 07, 2018**

Dear Researcher:

On 09/07/2018 the IRB approved the following modifications until 08/02/2019 inclusive:

Type of Review:	IRB Addendum and Modification Request Form Expedited Review
Modification Type:	Updated protocol, consent, debriefing form with required language
Project Title:	Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training
Investigator:	Jacob Naylor
IRB Number:	SBE-18-14198
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 08/02/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form.

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

This letter is signed by:

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html
Amended 8/27/2018

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Jacob Naylor**

Date: **August 03, 2018**

Dear Researcher:

On 08/03/2018 the IRB approved the following human participant research until 08/02/2019 inclusive:

Type of Review:	UCF Initial Review Submission Form Expedited Category #7
Project Title:	Assessing the Suitability of DXTRS to Support Sustainment Training
Investigator:	Jacob Naylor
IRB Number:	SBE-18-14198
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 08/02/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form.

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

This letter is signed by:

Signature applied by Gillian Morien on 08/03/2018 11:35:49 AM EDT

Designated Reviewer

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Jacob Naylor**

Date: **September 07, 2018**

Dear Researcher:

On 09/07/2018 the IRB approved the following modifications until 08/02/2019 inclusive:

Type of Review:	IRB Addendum and Modification Request Form Expedited Review
Modification Type:	Updated protocol, consent, debriefing form with required language
Project Title:	Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training
Investigator:	Jacob Naylor
IRB Number:	SBE-18-14198
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 08/02/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form.

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

This letter is signed by:

Signature applied by Racine Jacques on 09/07/2018 01:02:30 PM EDT

Designated Reviewer

APPENDIX K: RESEARCH PROTECTIONS ADMINISTRATIVE REVIEW (RPAR)

DEPARTMENT OF THE ARMY
OFFICE OF THE SURGEON GENERAL
7700 ARLINGTON BOULEVARD
FALLS CHURCH, VA 22042-5140

DASG-HRPO 10 September 2018

MEMORANDUM FOR MAJ Jacob "TJ" Naylor, BS, MBA, Student Detachment, Ft. Jackson, SC, Physical Address: 1275 Sangria Circle Rockledge, FL 32955

SUBJECT: Research Protections Administrative Review (RPAR) for University of Central Florida (UCF) Institutional Review Board (IRB) Study #SBE-18-14198, *Assessing the suitability of the Division Exercise Training and Readiness System (DXTRS) to support sustainment training*, Principal Investigator (PI): MAJ Jacob "TJ" Naylor

1. Review Outcomes

The Army Human Research Protections Office (AHRPO) RPAR of the above-referenced activity is complete. RPAR review is required to ensure that Department of Defense (DOD)-supported research involving human subjects is compliant with DOD requirements in DOD Instruction (DODI) 3216.02.

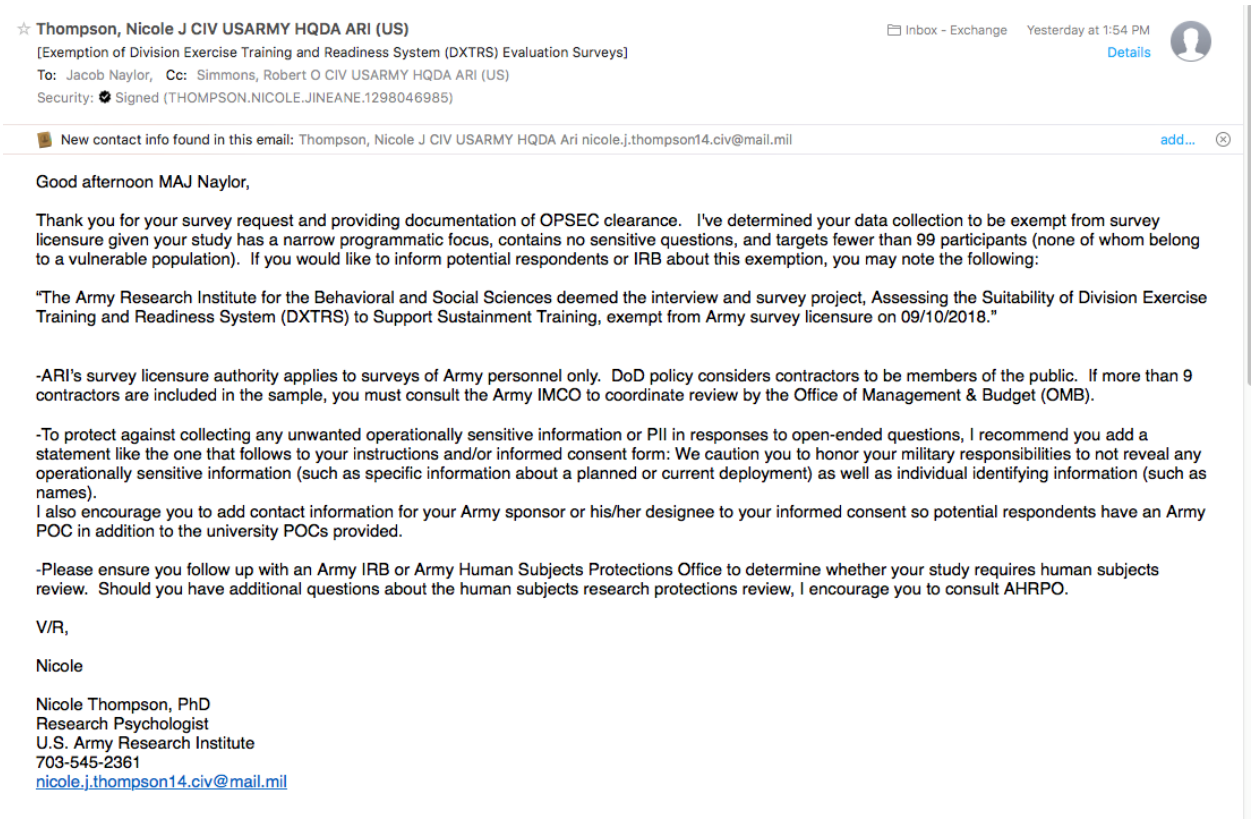
DOD-supported research involving human subjects is defined as research involving human subjects for which the DOD is providing at least some of the resources, including but not limited to funding, facilities, equipment, personnel (investigators or other personnel performing tasks identified in the research protocol), access to or information about DOD personnel for recruitment, or identifiable data or specimens from living individuals. It includes both DOD-conducted research involving human subjects (intramural research) and research conducted by a non-DOD institution.

The UCF IRB determined that this project meets the criteria for expedited research IAW 45 CFR 46.110(b)(1)(i) category 7: *Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

AHRPO *does not concur* with this determination and instead has determined that this activity does not meet the regulatory definition of research IAW 32 CFR 219.102(l). Research means a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge.

Activities designed to develop or contribute to generalizable knowledge are those designed to draw general conclusions, inform policy or generalize outcomes beyond the specific group, entity or institution (i.e., to elaborate, to be an important factor in identifying or expanding truths, facts, information that are universally applicable).

APPENDIX L: ARMY RESEARCH INSTITUTE APPROVAL



☆ **Thompson, Nicole J CIV USARMY HQDA ARI (US)**
[Exemption of Division Exercise Training and Readiness System (DXTRS) Evaluation Surveys]
To: Jacob Naylor, Cc: Simmons, Robert O CIV USARMY HQDA ARI (US)
Security: Signed (THOMPSON.NICOLE.JINEANE.1298046985)

Inbox - Exchange Yesterday at 1:54 PM
Details

New contact info found in this email: Thompson, Nicole J CIV USARMY HQDA Ari nicole.j.thompson14.civ@mail.mil add...

Good afternoon MAJ Naylor,

Thank you for your survey request and providing documentation of OPSEC clearance. I've determined your data collection to be exempt from survey licensure given your study has a narrow programmatic focus, contains no sensitive questions, and targets fewer than 99 participants (none of whom belong to a vulnerable population). If you would like to inform potential respondents or IRB about this exemption, you may note the following:

"The Army Research Institute for the Behavioral and Social Sciences deemed the interview and survey project, Assessing the Suitability of Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training, exempt from Army survey licensure on 09/10/2018."

-ARI's survey licensure authority applies to surveys of Army personnel only. DoD policy considers contractors to be members of the public. If more than 9 contractors are included in the sample, you must consult the Army IMCO to coordinate review by the Office of Management & Budget (OMB).

-To protect against collecting any unwanted operationally sensitive information or PII in responses to open-ended questions, I recommend you add a statement like the one that follows to your instructions and/or informed consent form: We caution you to honor your military responsibilities to not reveal any operationally sensitive information (such as specific information about a planned or current deployment) as well as individual identifying information (such as names).
I also encourage you to add contact information for your Army sponsor or his/her designee to your informed consent so potential respondents have an Army POC in addition to the university POCs provided.

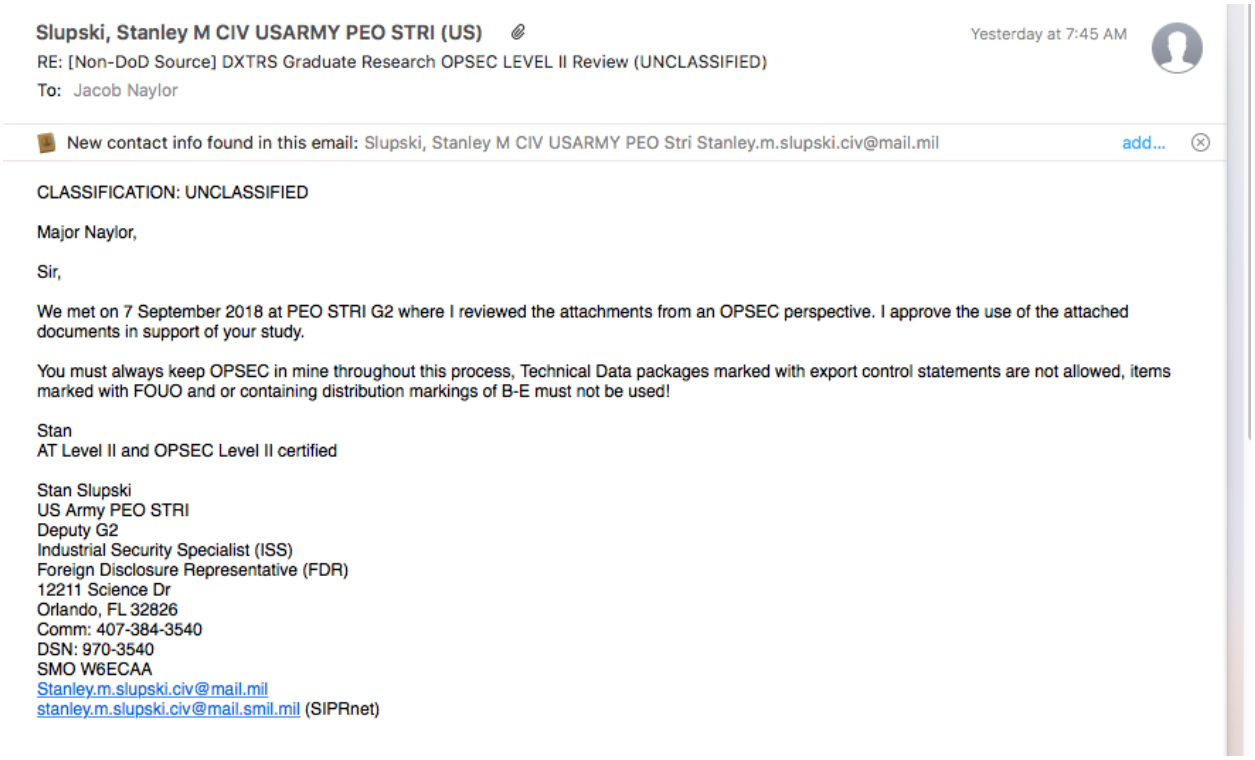
-Please ensure you follow up with an Army IRB or Army Human Subjects Protections Office to determine whether your study requires human subjects review. Should you have additional questions about the human subjects research protections review, I encourage you to consult AHRPO.

V/R,

Nicole

Nicole Thompson, PhD
Research Psychologist
U.S. Army Research Institute
703-545-2361
nicole.j.thompson14.civ@mail.mil

APPENDIX M: OPERATIONS SECURITY LEVEL II REVIEW



Slupski, Stanley M CIV USARMY PEO STRI (US) Yesterday at 7:45 AM

RE: [Non-DoD Source] DXTRS Graduate Research OPSEC LEVEL II Review (UNCLASSIFIED)

To: Jacob Naylor

New contact info found in this email: Slupski, Stanley M CIV USARMY PEO Stri Stanley.m.slupski.civ@mail.mil add...

CLASSIFICATION: UNCLASSIFIED

Major Naylor,

Sir,

We met on 7 September 2018 at PEO STRI G2 where I reviewed the attachments from an OPSEC perspective. I approve the use of the attached documents in support of your study.

You must always keep OPSEC in mine throughout this process, Technical Data packages marked with export control statements are not allowed, items marked with FOUO and or containing distribution markings of B-E must not be used!

Stan
AT Level II and OPSEC Level II certified

Stan Slupski
US Army PEO STRI
Deputy G2
Industrial Security Specialist (ISS)
Foreign Disclosure Representative (FDR)
12211 Science Dr
Orlando, FL 32826
Comm: 407-384-3540
DSN: 970-3540
SMO W6ECAA
Stanley.m.slupski.civ@mail.mil
stanley.m.slupski.civ@mail.smil.mil (SIPRnet)

APPENDIX N: COMMAND APPROVAL MEMORANDAUMS

DEPARTMENT OF THE ARMY
UNITED STATES ARMY STUDENT DETACHMENT
5450 STROM THRUMOND BOULEVARD, ROOM 244
FORT JACKSON, SC 29207-7003

ATMT-LTB-SD 7 June 2018

MEMORANDUM FOR CPT ANDREW KRUMM, Aviation Center of Excellence, Building 5911 Andrews Ave. Fort Rucker, AL 36362

SUBJECT: Research Access Permission

Name of Researcher: MAJ Jacob Naylor
Title of Protocol: Assessing the Suitability of DXTRS to Support Sustainment Training
Protocol Number:
Date of Protocol:

1. References:

a. Title 32 Code of Federal Regulations, Part 219, Protection of Human Subjects

b. Department of Defense (DOD) Instruction 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DOD-Supported Research

c. Army Regulation 70-25, Protection of Human Subjects in Research

d. MAJ Jacob "TJ" Naylor is authorized to conduct research activities which include administering surveys about the Division Exercise Training and Readiness System (DXTRS) to Army Officers. He will be provided administrative support which includes work space. This authorization applies to both on duty and off duty hours from 13 July 2018 thru 1 November 2018.

2. Approval. I hereby approve the request for support described below.

3. Scope. I give permission for the U.S Army Aviation Captains Career Course to provide support to the above referenced research by providing access to U.S Army Aviation Career Course Captains stationed at Fort Rucker, Alabama. This permission is provided pursuant to the terms of Reference d above.

4. Conditions of approval for research involving human subjects: If this activity is research involving human subjects, this approval is provided on the condition of, and with the understanding that, the researcher's institution will:

a. Provide to my command any human research protection program-related support necessary to implement and oversee the above referenced activity.

b. Obtain and comply with the terms of its Federal Assurance for the Protection of Human Research Subjects for this DOD supported research involving human subjects (if applicable).

c. Inform me via my point of contact below regarding any relevant unanticipated problem involving risk to subjects or others, or serious or continuing noncompliance.

DEPARTMENT OF THE ARMY
HEADQUARTERS, SOUTHERN TRAINING DIVISION
84TH TRAINING COMMAND
10949 AEROSPACE AVENUE
HOUSTON, TX 77034-5563

AFRC-ATC-SO 11 July 2018

MEMORANDUM FOR DIRECTOR HOUSTON MISSION TRAINING COMPLEX HOUSTON, TX 77034-5563

SUBJECT: Research Access Permission

Name of Researcher: MAJ Jacob Naylor
Title of Protocol: Assessing the Suitability of DXTRS to Support Sustainment Training
Protocol Number:
Date of Protocol: 11 July 2018

1. References:

a. Title 32 Code of Federal Regulations, Part 219, Protection of Human Subjects

b. Department of Defense (DOD) Instruction 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DOD-Supported Research

c. Army Regulation 70-25, Protection of Human Subjects in Research

d. MAJ Jacob "TJ" Naylor is authorized to conduct research activities which include administering surveys about the Division Exercise Training and Readiness System (DXTRS) to personnel assigned to or training with the southern training division of the 84th Training Command. This access applies to all Department of Defense (DoD) civilians, contractors and Army officers. Sufficient workspace and administrative support to conduct research activies is provided. This authorization applies during duty hours from 13 July 2018 thru 1 November 2018.

2. Approval. I hereby approve the request for support described below.

3. Scope. I give permission for the Houston Mission Training Complex of the 84th Training Command to support the above referenced research by providing access to U.S Army (DoD) civilians, contractors and Army officers assigned to or training with the southern training division of the 84th Training Command. This permission is provided pursuant to the terms of Reference d above.

4. Conditions of approval for research involving human subjects: If this activity is research involving human subjects, this approval is provided on the condition of, and with the understanding that, the researcher's institution will:

a. Provide to my command any human research protection program-related support necessary to implement and oversee the above referenced activity.

b. Obtain and comply with the terms of its Federal Assurance for the Protection of Human Research Subjects for this DOD supported research involving human subjects (if applicable).

DEPARTMENT OF THE ARMY
HEADQUARTERS, ATLANTIC TRAINING DIVISION
84TH TRAINING COMMAND
5520 NASHVILLE STREET
FORT DIX, NJ 08640

AFRC-TTX-MTC 30 July 2018

MEMORANDUM FOR DIRECTOR JBMDL MISSION TRAINING COMPLEX FORT DIX, NJ 08640

SUBJECT: Research Access Permission

Name of Researcher: MAJ Jacob Naylor
Title of Protocol: Assessing the Suitability of DXTRS to Support Sustainment Training
Protocol Number: SBE-18-14198
Date of Protocol: 11 July 2018

1. References:

a. Title 32 Code of Federal Regulations, Part 219, Protection of Human Subjects

b. Department of Defense (DOD) Instruction 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DOD-Supported Research

c. Army Regulation 70-25, Protection of Human Subjects in Research

d. MAJ Jacob "TJ" Naylor is authorized to conduct research activities which include administering surveys about the Division Exercise Training and Readiness System (DXTRS) to personnel assigned to or training with the Atlantic Training Division of the 84th Training Command. This access applies to all Department of Defense (DoD) civilians, contractors and Army officers. Sufficient workspace and administrative support to conduct research activies is provided. This authorization applies during duty hours from 4 August 2018 thru 1 November 2018.

2. Approval. I hereby approve the request for support described below.

3. Scope. I give permission for the JBMDL Mission Training Complex of the 84th Training Command to support the above referenced research by providing access to U.S Army (DoD) civilians, contractors and Army officers assigned to or training with the Atlantic Training Division of the 84th Training Command. This permission is provided pursuant to the terms of Reference d above.

4. Conditions of approval for research involving human subjects: If this activity is research involving human subjects, this approval is provided on the condition of, and with the understanding that, the researcher's institution will:

a. Provide to my command any human research protection program-related support necessary to implement and oversee the above referenced activity.

b. Obtain and comply with the terms of its Federal Assurance for the Protection of Human Research Subjects for this DOD supported research involving human subjects (if applicable).

APPENDIX O: INFORMED CONSENT

Title of research study: *Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training*

Informed Consent

Principal Investigator(s): **Jacob "TJ" Naylor**

Co-Investigators or Sub-Investigator(s): none

Faculty Supervisor: ***Dr. Michael Proctor***

Sponsor: ***Industrial Engineering and Management Systems***

Investigational Site(s): ***Fort Rucker, Alabama; Fort Lee, Virginia; Fort Campbell, Kentucky; Houston, TX, & Fort Dix, NJ***

Why am I being invited to take part in a research study?

We invite you to take part in a research study because we are assessing the suitability of the Division Exercise Training and Readiness System (DXTRS) as a sustainment training tool. This research can provide a perspective for the Army on a way to use DXTRS as a sustainment training option instead of as a maneuver exercise driver. The primary target population for this study are Army logistics officers in the grade of O3-O5. Though, Army officers O3-O5, Department of the Army Civilians and Department of Defense contractors with an operations role at a mission training center (MTC) are also included in this study. This population reflect officers at various levels from battalion through division that are either logistics officers by military specialty and/or responsible for operations at their organization which typically includes planning the training. Individuals that do not meet this criteria will not participate in this study. *You must be 18 years of age or older to participate in this study*

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at the University of Central Florida or the primary investigator at 913-547-6442 or tj.naylor@knights.ucf.edu.

This research has been reviewed and approved by an Institutional Review Board ("IRB"). You may talk to them at 407-823-2901or irb@ucf.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Why is this research being done?

The purpose of this research is to provide the Army with an alternative sustainment training tool in the absence of the Battle Command Sustainment Support System (BCS3) that was divested in 2016. Potentially, DXTRS has the ability to provide units the ability to train multiple iterations during a home station sustainment training exercise. Lastly, the minimal costs and accessibility provided by DXTRS makes an ideal training option for units as they train up for larger collective training exercises such as Warfighter or Ulchi Freedom Guardian (UFG).

How long will the research last?

We expect that you will be in this research study for a minimum of 1 hour and a maximum of 3 hours. The duration depends on how fast or slow you fill out the surveys.

How many people will be studied?

There is a maximum of 35 people that are expected to participate in this study.

What happens if I say yes, I want to be in this research?

- During this study you will be given several surveys to fill out to assess the suitability of DXTRS as a sustainment training tool. Additionally, some participants may be asked to participate in a telephonic interview not to exceed one hour. This study concludes on or about 30 November 2018.

  Daily Timeline (1 day/visit):

  Step 1: provide research overview

  Step 2: Informed Consent

  Step 3: Biographical survey

  Step 4: Suitability & Performance Questionnaire

  Step 5: Debrief

  Step 6: Questions(if needed)

  Step 7: Survey Concludes

What are my responsibilities if I take part in this research?

If you take part in this research, you will be responsible to fill out survey's pertaining to DXTRS to the best of your knowledge.

What happens if I do not want to be in this research?

Participation in this research is completely voluntary. You can decide to participate or not to participate. Your participation in this study is voluntary. You are free to withdraw your consent and discontinue participation in this study at any time without prejudice or penalty. Your decision to participate or not participate in this study will in no way affect your employment, promotion status or standing in the Army.

What happens if I say yes, but I change my mind later?

You can leave the research at any time and it will not be held against you. The data collected up until your withdrawal will be destroyed.

Will being in this study help me in any way?

There are no benefits to you from your taking part in this research.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information is the UCF and other representatives of this organization.

Signature Block for Capable Adult

Your signature documents your permission to take part in this research.

Signature of subject	Date
Printed name of subject	
Signature of person obtaining consent	Date
Printed name of person obtaining consent	

APPENDIX P: PROTOCOL

PROTOCOL TITLE: *Assessing the Suitability of DXTRS to Support Sustainment Training*

INSTRUCTIONS:

- *If you believe your activity may not meet the definition of "Human Research" subject to IRB oversight, please complete and submit HRP 500 – Research Activity Form prior to developing you protocol.*
- *If you believe your activity meets the definition of "Human Research" subject to IRB oversight, please complete this protocol "TEMPLATE PROTOCOL (HRP-503" to prepare a document with the information from following sections. Be sure that all study materials are correct and consistent with the information in this protocol.*
- *Depending on the nature of what you are doing, some sections may not be applicable to your research. If so mark as "NA". For example, research involving a retrospective chart review may have many sections with NA. For subsections, like 1.x or 8.x, you can delete it if it's not applicable.*
- *When you write a protocol, keep an electronic copy. You will need to modify this copy when making changes.*
- *As you are writing the protocol, remove all instructions in italics so that they are not contained in the final version of your protocol.*
- *Omit starred (*) items if this is the activation of a protocol at a new site or sites that will be overseen by a principal investigator who will take separate and full responsibility for that site or those sites. Complete by describing information specific to the site(s). Do not repeat information in the approved protocol that applies to all site(s).*

PROTOCOL TITLE:

Assessing the Suitability of DXTRS to Support Sustainment Training

PRINCIPAL INVESTIGATOR:

Name: Jacob Naylor
Department: Modeling and Simulation
Telephone Number: 913-547-6442
Email Address:tj.naylor@knights.ucf.edu

VERSION NUMBER: 3

DATE: 16 August 2018

Table of Contents

1.0 Objectives*

1.1 The purpose of this research is to determine the suitability of DXTRS to serve as an alternative sustainment training tool for the Army.

1.2 The hypotheses to be tested are:

H1: DXTRS is a suitable training solution for sustainment training.

H2: DXTRS acceptance is highest amongst leaders whose organizations subjective norm supports training with the system.

H2a: The intention to use DXTRS is positively affected by the users perceived non- mandatory usage of DXTRS.

H2b: DXTRS usage is positively influenced by the users experience with DXTRS.

H3: DXTRS acceptance as a sustainment training solution is positively affected by perceived usefulness and image.

H4: DXTRS perceived usefulness as a sustainment training solution is positively influenced by its output quality.

H5: DXTRS usage is highest amongst leaders with high job relevance.

H6: The perceived usefulness of DXTRS is positively influenced by users perception of improved job performance.

H7: The intention to use DXTRS is negatively affected by NASA task load subscales frustration, mental demand and effort required to use the system.

H8: DXTRS logistics functionality negatively impacts performance rating

H8a: Sustainment training task achievement is negatively influenced by DXTRS logistics functionality.

H8b: A users ability to meet overall training objectives is negatively impacted by DXTRS logistics performance.

2.0 Background*

2.1 The military has used simulations to train Soldiers for several decades. Army Commanders use live, virtual and constructive training to prepare troops for combat and to improve their Military Occupational Specialty (MOS) skillset. During training and other military operations, the Army Battle Command Systems (ABCS) provide Army commanders with a Common Operational Picture (COP) which typically includes a real-time status of personnel, supplies, munitions, and equipment. In 2016, the Combined Arms Support Command (CASCOM) divested the Battle Command Sustainment Support System (BCS3) due to data latency issues (Dorsey, 2016). The Army streamlined its Joint Land Component Constructive Training Capability (JLCCTC) to reduce costs further limiting the usefulness of JLCCTC to train supporting units to sustain combat units with the personnel, supplies, munitions, and equipment necessary to replace losses during operations. This study considers the suitability of the Division Exercise Training and Readiness System (DXTRS) to fill the sustainment gap in training. Suitability is assessed in terms of acceptance and task load amongst intended users as measured by the technology acceptance model (TAM) and the NASA-TLX, respectively. Additionally the research seeks feedback on DXTRS technical issues as well as operational performance associated with the DXTRS as an Army logistic sustainment trainer.

2.2 Existing literature does not address alternative implementations for DXTRS. This study contributes to and advances current literature through the application of known methodology to determine the suitability of DXTRS to serve as a sustainment training tool. Additionally, the data from this study can be used to further improve the system and subsequently logistics training within the Army.

3.0 Inclusion and Exclusion Criteria*

3.1 The primary target population for this study are Army logistics officers in the grade of O3-O5. Though, Army officers O3-O5, Department of the Army Civilians and Department of Defense contractors with an operations role should also be included in this study. This population reflect officers at various levels from

battalion through division that are either logistics officers by military specialty and/or responsible for operations at their organization which typically includes planning the training for it. Individuals that do not meet this criteria will not participate in this study.

3.2 A valid military common access card or other form of Department of Defense identification stating name and rank will be used to screen participants for eligibility. All personnel that do not meet the criteria described above will be excluded from the study. All special population personnel are excluded from this study.

3.3 All eligible personnel that sign the consent form and complete the surveys designed for the study will be included in the final study sample.

4.0 Study-Wide Number of Subjects*

4.1 There are 22 participants needed for this study however a maximum of 35 personnel may participate in this study. The participants for this study are located at various U.S Army installations (Fort Campbell, KY; Fort Rucker, AL; Fort Lee, VA; Houston, TX and Fort Dix, NJ).

5.0 Study-Wide Recruitment Methods*

5.1 Participant recruitment is conducted by the local site and a memorandum of participation is provided by the commander of the supporting organization.

6.0 Multi-Site Research*

6.1 This is a multi- site study in which I will be available in person at each site as lead investigator. I will ensure that I have in my possession all updated protocol, consent form and IRB approvals. I will conduct the study in accordance with applicable federal regulations and local laws.

6.2 The confidentiality of all participants will be handled with the utmost professionalism and care. All data will be transported, stored and maintained by me through the duration of the study. Upon collection, all files will be transported using a backpack with a locking device to maintain the confidentiality of the participants. The files will be stored in a cabinet with a lock at my office.

7.0 Study Timelines*

7.1 An individual subject's participation in the study is expect to last approximately one hour following the use of a DXTRS supported training event. The one hour includes the time it takes to enroll participants in the study, discuss protocol, sign consent form, complete the biographical survey

and three suitability surveys and the out brief. The anticipated completion date for this study is 17 November 2018.

8.0 Study Endpoints*

8.1 The endpoint for this study is when all participants have signed their consent form, and completed the biographical and suitability surveys.

9.0 Procedures Involved*

9.1 This study involves the use of surveys to obtain general information about the participants (includes information pertaining to their name, age, sex and occupation within the Army) and determine the overall suitability of DXTRS to serve as a sustainment training tool. Once complete, the surveys are collected from the participants. The participants are given a debrief from the lead investigator and released to continue their regularly scheduled activities. The surveys are then placed in a backpack with a locking device and maintained by the lead investigator until he reaches his office and then the surveys will be safeguarded in a locked cabinet.

9.2 Due to the nature of this study, participants have minimal risks and will not be monitored following the completion of the study and long-term follow-up is not required. All participants have the right to cease participation in the study whenever they choose.

9.3 Participants may be asked to participate in a telephonic interview that will not exceed one hour.

10.0 Data and Specimen Banking*

10.1 N/A.

11.0 Data Management* and Confidentiality

11.1 Due to the limited availability of target population members, the research seeks to detect Cohen's theoretical large effect sizes with respect to ambivalence and that with an alpha error of .1 and beta error of .2. Researchers expect non-parametric statistics to be employed for analysis. Cronbach alpha's may be employed between similar TAM and TLX measures to further estimate the reliability of psychometric outcomes.

11.2 During the study, the surveys are transported in a backpack with a locking device and maintained by the lead investigator. Once the lead investigator reach his home office, the surveys will be safeguarded in a locked cabinet.

11.3 The surveys for this study collects the participants name and participant number. The participant number is used to refer to the participant for remainder of the study once collected to include data analysis to maintain confidentiality during the study. All participants receive the same treatment in regards to safeguarding their confidentiality. The lead investigator is in charge of collecting, transporting, storing, and analyzing all data collected during the study.

11.4 All identifying information collected during the study will be destroyed immediately following data collection. If required, any de-identified data will be stored for a minimum of 5 years per UCF policy.

12.0 Provisions to Monitor the Data to Ensure the Safety of Subjects*

N/A

13.0 Withdrawal of Subjects*

13.1 Participants are withdrawn from this study involuntarily if the information or identification provided is determined invalid during the conduct of the study.

13.2 Partial data collected from individuals that are withdrawn from the study is discarded and will not be used for data analysis.

14.0 Risks to Subjects*

14.1 This study involves the use of surveys and as a result contains minimal risk to subjects.

15.0 Potential Benefits to Subjects*

15.1 There is not a direct benefit for subjects that participate in this study.

16.0 Vulnerable Populations*

N/A

17.0 Community-Based Participatory Research*

N/A

18.0 Sharing of Results with Subjects*

N/A

19.0 Setting

19.1 The research locations for this study are various U.S Army installations at Fort Campbell, KY; Fort Rucker, AL; Fort Lee, VA and Houston, TX. The participants for this study were chosen because of their regularly scheduled training using DXTRS. As a result, the participants were not "recruited" in the traditional sense but were asked to participant in the study. A commander access form

will be provided by each site. All research procedures takes place in a classroom following the scheduled DXTRS training.

20.0 Resources Available

20.1 As previously stated, this research follows regularly scheduled DXTRS supported training. The personnel in charge of running the simulation and its operations are employees of the site and have intimate knowledge of the day to day operations at the site. The lead investigator will travel to each site to conduct research in conjunction with the host site but will not interfere with the DXTRS simulation operations. The lead investigator will observe the DXTRS simulation training as a trained Army Functional Area 57 simulations officer with 6 years' experience as an Army simulations professional. The lead investigator is solely responsible for interacting and handling all participants for this study at each site visited.

21.0 Prior Approvals

21.1 A commander's consent form is provided by each site prior to commencing research activities at the site. This ensures proper access to all study participants and adequate work space to conduct research activities.

22.0 Recruitment Methods

22.1 The participants for this study were "recruited" based on their regularly scheduled Army training using DXTRS. As a result, the participants were asked to participant in the study. The participants are tenant units of the research site conducting regularly scheduled training. The lead investigator posted a question on an Army simulation professional blog about DXTRS and was provided training locations that use DXTRS to support training. The training locations were contacted by the lead investigator to confirm training and thus the identification of training units and subsequent study participants identified. The training unit is under the command of the mission training center during training and thus access is provided by the training center providing the training to the unit. A copy of the message asked on the professional Army blog and the training locations provided are attached. Participants are not provided compensation for this study.

22.2 The lead investigator will also use word of mouth recruiting while at the DXTRS training sites to recruit participants. The study locations and the location of the unit commanders are separate and distinct. The study location is inside of the MTC and unit commanders are located in their tactical command posts limiting their involvement in the study and their influence on their subordinates.

22.3 Unit commanders will not be allowed in the research area while their Soldiers participate in the study. Additionally, Unit commanders will also be briefed by the lead investigator to ensure that there is not undue command influence for participating or not participating in the study.

23.0 Local Number of Subjects

23.1 The number of participants for each site is provided below.

Fort Campbell, KY: 10

Fort Rucker, AL:5

Fort Lee, VA: 5

Houston, TX: 10

Fort Dix, NJ: 5

23.2 There is a maximum of 35 personnel amongst all the sites visited. Only 22 personnel is required for the study, however, additional personnel are scheduled to account for personnel that may choose not to participate in the study.

24.0 Provisions to Protect the Privacy Interests of Subjects

24.1 The privacy of the participants will be protected during the study. The participants angst about the study will be put "at ease" by describing to them the impact that they are making on the Army by providing feedback on a simulation system that can enhance training for Army personnel. Additionally, the participants will be reminded that their identity is protected once they are provided a participant number which eliminates the need to use their actual name. Lastly, the research team does not require additional information about the participants other than the information included in the demographic survey and no attempts will be made to obtained additional information.

25.0 Compensation for Research-Related Injury

25.1 N/A

26.0 Economic Burden to Subjects

26.1 N/A

27.0 Consent Process

27.1 A written informed consent will be signed by each participant prior to participation in this study. Following consent, all participants will remain in the research location until the study is complete or the participant chooses to no longer participate in the study. The lead

investigator will remain in the research location to address concerns from the participants.

28.0 Process to Document Consent in Writing

28.1 The written consent form will be provided to each participant to sign and return to the lead investigator.

29.0 Drugs or Devices

N/A

DXTRS Study Debrief Script

Study Title: Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training

Principal Investigator(s): Jacob "TJ" Naylor

Co-Investigators or Sub-Investigator(s): none

Faculty Supervisor: ***Dr. Michael Proctor***

Sponsor: ***Industrial Engineering and Management Systems***

Investigational Site(s): ***Fort Rucker, Alabama; Fort Lee, Virginia; Fort Campbell, Kentucky; Houston, TX, & Fort Dix, NJ***

Thank you all for your participation in this study "*Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training".*

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at ***the University of Central Florida or the primary investigator at 913-547-6442 or*** tj.naylor@knights.ucf.edu.

As a reminder this research has been reviewed and approved by the UCF Institutional Review Board ("IRB"). You may talk to them at 407-823-2901 or irb@ucf.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

UCF University of Central Florida IRB
IRB NUMBER: SBE-18-14198
IRB APPROVAL DATE: 08/27/2018
IRB EXPIRATION DATE: 08/02/2019

APPENDIX Q: INTERVIEW TRANSCRIPTS (DATA)

Participant 1 Interview Transcript

1. Q: What is your current duty position?

R: I'm a simulations officer(LTC) at 120 Infantry Brigade, 1st Army.

2. Q: Have you used DXTRS v 1.060 for training?

R: No, but I'm very familiar with it. I observed its use in another unit. I'm more familiar with JDLM which we are also using for this exercise. It isn't perfect but gets the job done.

SQ: If yes, please share your thoughts on how the logistics functions worked?
R: N/A

SQ: If no, why didn't you use DXTRS v 1.060?

R: It's current logistics capability isn't sufficient to use to train sustainment units. I believe that it is a good training tool for brigade and below to use for STAFFEX in its current state. Like I said, I'm more familiar with JDLM and use it to train logistics units here at 1st Army. I like the availability of DXTRS but it needs more work. I've also used JCATS and JDLM together to train units. If you ever need to train aviators you may want to consider Muse VRSG or Muse ViPRS.

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: No, the current capabilities are not adequate however it is a great tool to use for training and has great flexibility when considering that it can be downloaded from Milsuite and used locally.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: [participant started speaking then paused] Yes, I saw it displayed on a CPOF but I'm not sure of the effort required to get it working. I remember seeing a unit icon moving along the map. We heavily rely upon our contractors to help us with getting our system interacting/communicating properly with the simulations. They do a great job of getting us connected. In some ways I love having the contractors to help and in others I think they can be a crutch but that's enough of that soapbox. They are definitely valued members of the team. For sure. Not enough S6's and 57s to get the job done properly.
(Note: he didn't seem sure about the DXTRS version).
SQ: If no, why? N/A

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: I believe DXTRS is a good training solution and I'm the person responsible for recommending training tools and simulations to the unit. However, at the current moment I don't believe it can be used to drive an entire log exercise without a system like JDLM. Makes you wonder if that could change how they decide if JDLM will go away for good. I hear a replacement is in the works…[sarcastic laugh]…I can't wait to see how it turns out.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R: DXTRS use is not mandatory.

SQ: If no, why? N/A

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: I think so but I'm not sure because I didn't see it setup or physically use it for training.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?
R: Yes, but improvements to its logistics functions are required such as its convoy movements. I guess that answer should have been a no..but you get what I'm saying.

SQ: If no, what improvements would you make? N/A

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: DXTRS improvement or another logistics training tool should have a cloud application which could be used for both real world and training. It also makes sense to have it interact with GCCS-A to pull data. If someone can figure that out they'll be rich [smirks…then laughs].
(note: seems very passionate about training and simulation)

Interview conclude

Participant 2 Interview Transcript

1. Q: What is your current duty position?

R: Operations Officer (CPT) for the Aviation Captains Career Course

2. Q: Have you used DXTRS v 1.060 for training?

R: Yes, kind of
(NOTE: he seemed unsure about the DXTRS version but believes its 1.060)

SQ: If yes, please share your thoughts on how the logistics functions worked?
R: We attempted to use DXTRS version 1.060 for training but it did not work properly so we finished our MDMP brief using the older version 1.040…oh well.
(Note: he seemed really annoyed with DXTRS)

SQ: If no, why didn't you use DXTRS v 1.060?

R: N/A

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: No. I don't think it has enough capability and we didn't try to do anything fancy logistics with it. Due to several problems we had with the system we are going to change the simulation we use for this event. I hate that we have to change [said sarcastically].
(Note: he used sarcasm to show frustration with the system)

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: Yes, we had it working with CPOF. The setup with it wasn't too bad. There are good things about the system but it needs more capability.

SQ: If no, why? N/A

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: No.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R: N/A

SQ: If no, why? I kind of mentioned it earlier but it just needs more capability. I'd love to see what it looks like if they continue to improve it.

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: yes, it wasn't hard to use but we need something with more capability for the aviation tasks we need to accomplish during the event.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R: No.
SQ: If no, what improvements would you make?
R: I'm a bit biased because we use it primarily for MDMP and discussing aviation tasks. The ability to see supplies delivered would be nice but it could be more useful if they make the logistics capability better.

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: As I said earlier this system no longer suits our needs so we are planning to switch to the AVCATT.

Interview conclude

Participant 3 Interview Transcript

1. Q: What is your current duty position?

R: Trainer/DoD contractor at Houston MTC
(note: in position less than 6 months)

2. Q: Have you used DXTRS v 1.060 for training?

R: Briefly, it was planned for one of our exercises but due to technical performance issues we used a later version to continue mission. I don't think we fully figured out the issue.

SQ: If yes, please share your thoughts on how the logistics functions worked?

R: I can't really answer this based on the operational training but we received training on DXTRS and it covered some logistics stuff and I do know that the logistics reporting and convoy capabilities are limited. I really like the system. I also used JDLM several times and it is good because it provides a lot of information but DXTRS is more fun to use and not as cumbersome. Seems like JDLM almost has too much information in some ways. I wish we could use it(DXTRS) more but I heard we may have to start using WARSIM-B but I'm not sure why.

(Note: seemed genuinely excited about simulations and DXTRS)

SQ: If no, why didn't you use DXTRS v 1.060? N/A

R:

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: No but it is a good training tool however the version 1.060 or whatever version it was didn't appear to be robust enough when I saw it in training to serve as a JDLM replacement. Like I said earlier the log reporting and convoys need to be improved.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: N/A

SQ: If no, why?
R: No due to the technical issues the interoperability with CPOF didn't work when we tried to use it operationally. I'm not sure if it worked during our training because that was done in a separate group.

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: NO.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R:

SQ: If no, why? No. It seems as a good system but because of its limited logistics functionality it can't be used solely as a logistics tool by us (Houston MTC).

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: Yes, it is a lot easier to use than JDLM.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R: We wouldn't use it solely for logistics because training units tend to prefer JDLM so we tend to use DXTRS in the background like it is now.
SQ: If no, what improvements would you make? N/A

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: I have limited exposure with DXTRS but it was very easy to use. It seemed to have less querying capabilities than JDLM. I like the flexibility of it.
Interview conclude

Participant 4 Interview Transcript

1. Q: What is your current duty position?

R: CPT 90A(Logistician); MSEL Manager
(note: referred to as an honorary FA57 by DoD contractors because of knowledge and duty position)

2. Q: Have you used DXTRS v 1.060 for training?

R: not knowingly. However it is implemented into the simulation plan for our exercise this week. [LOL…smirks] so I guess the answer is yes.

SQ: If yes, please share your thoughts on how the logistics functions worked?

R: I'm not completely sure what DXTRS does but I know now that it is linked up with JDLM and CPOF for our exercise but I don't know all of its capabilities. I'm usually more involved with the simulations for our exercise but I had to mobilize later than expected and I missed a lot of stuff. As a loggie I've used JDLM several times and it is ok but I wish we had more flexibility to change logistics functions. We still need a system that we can use down range to get away from manual solutions for real world operations.
(note: didn't really like the idea of using JDLM and CPOF for the training unit because they don't have it "down range" and the training unit complained about it numerous times).

SQ: If no, why didn't you use DXTRS v 1.060?

R: N/A

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: I'm not sure because I've only seen it used the way it's being used for the exercise. I'd love to see what it can do by itself as a standalone system.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: The CPOFs work fine with DXTRS but we don't use it as much as we used to because we leverage sharepoint and SIPR teleconference (SVT) assets. We have the training unit set up CPOFs because they are required to but down range they track a lot of civilian vehicles which you cannot track via CPOF.
Naylor: I believe there is a way to make that work in JDLM which in turn would show it in CPOF.
R: I heard that before but we barely got our task organization done on time so there was no time to do extra stuff and that's not something you want to do on the fly.

SQ: If no, why? N/A

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: No because we don't use it for that function it is more of a supporting system.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R:

SQ: If no, why? We use it more as a supporting system but seems like a great tool for a battalion and maybe a brigade sized unit.

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: I'm not sure because our contractors and a few "pucksters" operate the equipment however they have never complained about it being hard like other systems. We are going away from using the term "puckster" in favor of the term simulation data manipulator. It sounds more official and will likely get more volunteers. To get these exercises right you really have to get the 57's, contractors and simulation data manipulators on the same page.
[Note: eyes basically sparkling as he spoke about the exercise design and operational logistics of the exercise]

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R: sure if it is used the way it was during this exercise but we use a lot of CASCOM products to train the logistics units and that is primarily JDLM.
SQ: If no, what improvements would you make? N/A

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: JDLM worked great but we didn't have a good synch with the JDLM contract support team but we (the unit) need to do a better job organizing our data so that our data reflects accurately in JDLM or equivalent simulation. We would prefer to use a simulation that also uses GCCS-A like BCS3 did. JDLM is ok but it would be better for the training audience to use real world systems. I would also like to see more secure VTC capabilities becase the high level logistics units use that a lot down range. I also think we need to figure out how to get lot numbers in JDLM. It would help to have lot numbers to follow through with MSEL injects.

Interview conclude

Participant 5 Interview Transcript

1. Q: What is your current duty position?

R: DoD contractor; simulation trainer at Houston MTC

2. Q: Have you used DXTRS v 1.060 for training?

R: Yes but for our last exercise we had to use a previous version because it didin't work properly with JDLM and CPOF. I attended some of the 1.060 training but had another mission so I didn't see all of the functionality at the training.

SQ: If yes, please share your thoughts on how the logistics functions worked?

R: N/A

SQ: If no, why didn't you use DXTRS v 1.060?

R: I haven't used DXTRS as a stand-alone system but it seems that it is a good system to train. Several other trainers mentioned that the logistics functions are not enough to do a standalone exercise but I've never been in the military so I'm not sure about that part. I just know that when they get us that task organization we can get their database straight for whatever training they want to do..[excitedly. Smiles] I'm here to help and I love it when the units show the same enthusiasm and we actually get a FA57 to work with because they almost become an extension of us to get what we need from the unit and they "get it".

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: I'm not sure but based on feedback from the other trainers it seems at the moment it needs more capability to act in the same manner as JDLM. I like DXTRS and I wish we would use it more to test its capabilities instead of using it as a pass through/supporting system in the background to share information.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R:

SQ: If no, why? No we did not get version 1.060 working with JDLM and CPOF however we did have the previous version working great. In fact, we have it here today [gets up to check the DXTRS version in use at the exercise]. Yea is 1.040. In our last version we had to go back to this version because the other one didn't work and I'm not sure why our version didn't work but I'm sure our database guy is going to check it out so we can use it again in the future. I think he already contacted the DXTRS folks that came down and did the training from Kansas. The DXTRS training guy we had was really nice and very good.
[Note: the DXTRS trainer referred to in the previous question is a retired FA57 LTC]

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: No, we love DXTRS but have not use it to train as a standalone system.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R:

SQ: If no, why?

R: No but we use it a lot and believe in its capabilities as a training option but it appears through talks with other trainers that it needs more functionality to support our customers. We will continue to use the system. We love how easy it is to use but a lot of times we suggest the use of it to our customers but it's not dictated. I've used JDLM more but it seems like we are making a change to WARSIM. I would like to use DXTRS, JDLM and CPOF in the MRF before we transition to WARSIM and see what happens. This machine over here says MRF but you will need to verify with our database guy if that is actually what's happening.
[Note: That MRF comment was followed up with the database person and they in fact used DXTRS, JDLM and CPOF in the MRF however they did use an ERF configuration and plan to try a true MRF configuration later]

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: I received DXTRS training a few months ago and it was very easy to use and I think that most people that are decent with computers can use it easily. Like I said earlier, I like JDLM but DXTRS is much easier to use. JDLM has a lot of information. That's why we like to get the units task organization as early in the planning process as possible because that really sets the stage for success in terms of properly allocating equipment and personnel.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R: N/A
SQ: If no, what improvements would you make? No, I kinda spoke to this earlier [yawn] about needing more capability but it could be probably be used for logistics training like JDLM if the capabilities are improved. That's partly why we use DXTRS in conjunction with JDLM. I also really want to use DXTRS, CPOF and JDLM in the MRF.

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: No not really. I think I probably said too much already[smiles]. I wish you the best of luck!

Interview conclude

Participant 6 Interview Transcript

1. Q: What is your current duty position?

R: Exercise Planning Officer; Aviator (Major (Reserves)); OC/T

2. Q: Have you used DXTRS v 1.060 for training?

R: No not personally.

SQ: If yes, please share your thoughts on how the logistics functions worked?
R: N/A

SQ: If no, why didn't you use DXTRS v 1.060?

R: I think we used DXTRS, JDLM and CPOF in a previous exercise as well as the last one we did in August but I didn't realize that DXTRS played a part in the exercise because from our position and to the training audience you can't tell. Honestly, I don't worry about the simulation stuff too much because of our FA57 takes care of that stuff pretty good. [you should talk to him as well and he can give you some more insight].

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: I'm not sure of its capabilities but we chose to use JDLM because that's what CASCOM plans the CPX-Fs with. We are basically forced to use JDLM to do the CPX-F. I know this last event was a bit painful because CASCOM didn't get our task organization correct in the database until a few days before the exercise. They also had to come down to our location because we had issues with the database. I think the used a database of a TSC or ESC and then changed it to fit a sustainment brigade because they didn't have anything that fit our training unit properly. It was painful!

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: Yes worked well with CPOF now that I know we used DXTRS for the exercise. It seemed like it was just JDLM to most of us OC/T's and training audience. [laughs] actually I guess the true answer to this question is no since I don't think it's the same version but we don't ever really get into version numbers. We just talk about the system itself.

SQ: If no, why? N/A

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: Not really. Our MTC basically advises us on which simulations to use for our exercises. They are really a good organization. We don't really have knowledge on the full capability of DXTRS. I know the unit complained about the simulations [JDLM]capability but it was more on their shortcomings than the simulation. They had people filling staff positions days before the exercise so they really didn't have that cohesiveness you need as a staff going into a major training exercise like you would want.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R: no not really. The MTC basically advises us on the simulations and we use it with JDLM and CPOF primarily.

SQ: If no, why? N/A

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: I'm not sure. Seems like DXTRS should be used more. I'd like to look into it now that I know that we used it. We have a STAFFEX that we need to plan for the 77th SB.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R:
SQ: If no, what improvements would you make? N/A
I'm not sure what it needs but it seems the MTC use it in conjunction with the other systems for a reason but maybe it could work..I don't know.

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: We actually need to add another training event. A STAFFEX in particular because the staff of 77th SB was so new that some of them met at the training event and they were not able to meet the level of training that they needed. Our MTC is going through a digital upgrade so we may reach out to our DoD contractor and see if he can help us. [TJ advises the DXTRS as a standalone would be a perfect system for this new staff because they can get more training

repetitions. You may want to link up with the POCs at Leavenworth to see if they can help you…if you need it.]

Interview conclude

Participant 7 Interview Transcript

1. Q: What is your current duty position?

R: DoD contractor; Database Manager at Houston MTC

2. Q: Have you used DXTRS v 1.060 for training?

R: I attempted to use DXTRS 1.060 for a previous training exercise but it did not work as a gateway from JDLM to CPOF. We kept getting error messages on the CPOF. We have not used DXTRS as a standalone system but we have used it a lot alongside JDLM and CPOF in the ERF. For that particular exercise we kept getting connection issues with CPOF. We are not sure if it is DXTRS v1.060 that's the problem or if it's the link with JDLM. We had to use JDLM for the exercise because of its logistics capabilities so we changed DXTRS versions for the exercise and it worked perfectly. We will go back and work with the guys at Leavenworth to see what the issue is with 1.060.

SQ: If yes, please share your thoughts on how the logistics functions worked?

R: N/A

SQ: If no, why didn't you use DXTRS v 1.060?

R: explained in 2 above.

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R:. No because I haven't gotten it to work yet for the way I use it. We may need to look at DXTRS for its standalone capabilities but our logistics customers typically like JDLM because that's what CASCOM uses.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R:

SQ: If no, why?
R: No. This was kind of our main issue with 1.060. It wouldn't pass the information from JDLM to CPOF like the previous version. The CPOF kept getting connection error messages.

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R:

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R: N/A

SQ: If no, why? I would say no because we never used it as a standalone system. We enjoy DXTRS but find that DXTRS, JDLM and CPOF gives the customer what they need for training.

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: I think it is fairly easy to use but I might be a bit biased..[laughs a little]. We typically make sure our customers get what they need so if they are not capable of using it on their own we can help train and/or assist them.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R: N/A
SQ: If no, what improvements would you make?

R: No. the logistics functions are not as dynamic as JDLM although are good things about the system.

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: We need to go back and revisit 1.060 connection issues. I'm not sure if Leavenworth is going to do an update to it or not. We primarily use DXTRS in the background to pass data it receives from JDLM to CPOF. We restart it twice a day to clear out the CPOF cop form the transporters no longer being used in JDLM.
Interview conclude

Participant 8 Interview Transcript

1. Q: What is your current duty position?

R: Army Reserve Nurse and FA57 2BDE Det 1 84th TC

2. Q: Have you used DXTRS v 1.060 for training?

R: We touched on DXTRS a little bit at the SOC course so it probably isn't the current version out now. Since the course, I actually downloaded DXTRS at home and played with it a bit. I think it was 1.060 but I'm not sure. It was a few months ago.

SQ: If yes, please share your thoughts on how the logistics functions worked?

R: N/A

SQ: If no, why didn't you use DXTRS v 1.060?

R: It didn't work well with JDLM and CPOF so the MTC used a different version. I didn't get to play with the system during the exercise due to my exercise requirements.

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: I didn't get to play with the system under an operational context to see capability in action. We had issues with JDLM during the exercise because of the CASCOM CPX-F database. It took about 2 days on site to get JDLM fixed. The CPX-F database information had to be changed from an ESC to a sustainment Brigade. There were task organization changes that had to be made because the task organization was wrong originally.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: N/A

SQ: If no, why? Kind of talked about this earlier and it eventually worked with the other systems but I don't believe it was version 1.060.

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: No

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R:

SQ: If no, why? N/A

R: It's tough to measure because DXTRS was used as a supporting system but it worked great with CPOF to provide the COP. We did a previous exercise with solely JDLM and it had great convoy movement. I wonder how DXTRS fits into the new CP CE that's being talked about. Will it still be interoperable and network worthy?

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: yes from my limited knowledge of the system. I didn't have an issue operating it and I downloaded it from Milsuite at home with my CAC card. It seems easier than CPOF to me. JDLM just have massive amounts of data so it's a little harder to use.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R: N/A
SQ: If no, what improvements would you make?

R: No it still needs to improve a bit before it could be solely used as a logistics trainer.

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: I had a good time playing with it especially at home. I didn't realize that we used DXTRS until we had those initial issues at the beginning. You really can't tell the difference if you are not in the room where the contractors have it all setup. Our biggest issues were with CASCOM and getting our database fixed for the exercise. We have to do a STAFFEX to get the unit trained

up before their February Warfighter. [interviewer: you may want to look at DXTRS as a standalone to support the STAFFEX. You can get a lot of repetitions for the staff].

Interview conclude

Participant 9 Interview Transcript

1. Q: What is your current duty position?

R: Director, McGuire Dix Lakehurst MTC, GS Civilian

2. Q: Have you used DXTRS v 1.060 for training?

R: NO

SQ: If yes, please share your thoughts on how the logistics functions worked?
R: N/A

SQ: If no, why didn't you use DXTRS v 1.060?

R: We've been comfortable using 1.040 with JDLM and CPOF and haven't had time to transition to 1.060 in between different exercises.

3. Q: Do you believe that DXTRS v.1.060 is a viable option for logistics training if/when JDLM is replaced?

SQ: If no, why (explain using your best judgment based on previous experience)?

R: No. My response is largely based on version 1.040 because we haven't thoroughly looked at version 1.060. We primarily use DXTRS to pass information from JDLM to CPOF and not as a standalone system. Our customers need JDLM to support their training packages so we use it.

4. Q: Was DXTRS v.1.060 interoperable with other systems such as CPOF, JCR etc..?

SQ: If yes, Can you describe the work or effort required?

R: N/A

SQ: If no, why?

R: we haven't tried with 1.060 but version 1.040 works great with CPOF.

5. Q: Is DXTRS v.1.060 regarded as an adequate logistics training solution within your organization?

R: DXTRS is a good training tool but I can't say that but I can't say that version 1.060 is a good logistics training solution because we haven't tested it.

6.
SQ: If yes, Is using DXTRS v.1.060 mandatory?

R:N/A

SQ: If no, why? N/A

7. Q: Do you think that most organizations would find DXTRS v.1.060 easy to use?

R: I think it is fairly user friendly and easy to use. We haven't tested 1.060 yet but I don't see why it would be different.

SQ: If no, why? N/A

8. Q: Overall, given its current capability, would you use DXTRS v.1.060 for logistics training in the future?

R:
SQ: If no, what improvements would you make?

R: No we've never used DXTRS as a standalone system because our log units are often required to use JDLM with CASCOM CPX-F.

9. Q: Do you have any additional comments about using DXTRS v.1.060 for logistics training?

R: not really. I'm looking forward to testing version 1.060 to see the added log capability.

Interview conclude

Participant 10

TJ,

Good morning back at ya.

Per our telephone conversation the other day, I give you permission to use the notes from our conversation.

Sustainment units not only want to battle track their log convoys moving down the road, they also want all the data on consumption rates by classes of supply. Basically all the data that sustainers use to drive decision making and DXTRS does not provide the data they want nor does it make the little bit of data they do want accessible. To remedy their need for data, JDLM is used. When we trained at the Houston MTC we briefly discussed logistics but we did not provide any extra emphasis. It's pretty clear that the MTCs have been using their DXTRS systems in conjunction with JDLM and CPOF so we didn't see the need to provide special emphasis on the log stuff. I'll have to look at my notes from the MTC users conference to see what else the customers are saying about DXTRS. Currently, we are preparing for DXTRS version 1.070 release and developing a support plan for a new CGSC requirement. They are going to start using DXTRS for MDMP and staff training much like they did when they used Decisive Action in the past when you probably went through.

Let me know if this works. I can always run home at lunch and print out/sign the form and return if needed.

Good luck on the analysis! I am looking forward to seeing the final product!

APPENDIX R: DEBRIEF

Study Title: Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training

Principal Investigator(s): Jacob "TJ" Naylor
Co-Investigators or Sub-Investigator(s): none

Faculty Supervisor:	***Dr. Michael Proctor***
Sponsor:	***Industrial Engineering and Management Systems***
Investigational Site(s):	***Fort Rucker, Alabama; Fort Lee, Virginia; Fort Campbell, Kentucky; Houston, TX, & Fort Dix, NJ***

Thank you all for your participation in this unclassified study "*Assessing the Suitability of the Division Exercise Training and Readiness System (DXTRS) to Support Sustainment Training".*

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at ***the University of Central Florida or the primary investigator at 913-547-6442 or*** tj.naylor@knights.ucf.edu.

As a reminder this research has been reviewed and approved by the UCF Institutional Review Board ("IRB"). You may talk to them at 407-823-2901 or irb@ucf.edu if:
Your questions, concerns, or complaints are not being answered by the research team.
You cannot reach the research team.
You want to talk to someone besides the research team.
You have questions about your rights as a research subject.
You want to get information or provide input about this research.

APPENDIX S: Decision Making Models

The seven step decision making model identified by Neal Litherland (2017) and illustrated by Negulescu (2014) is similar to the Army's MDMP. An example of both decision making models is provided below.

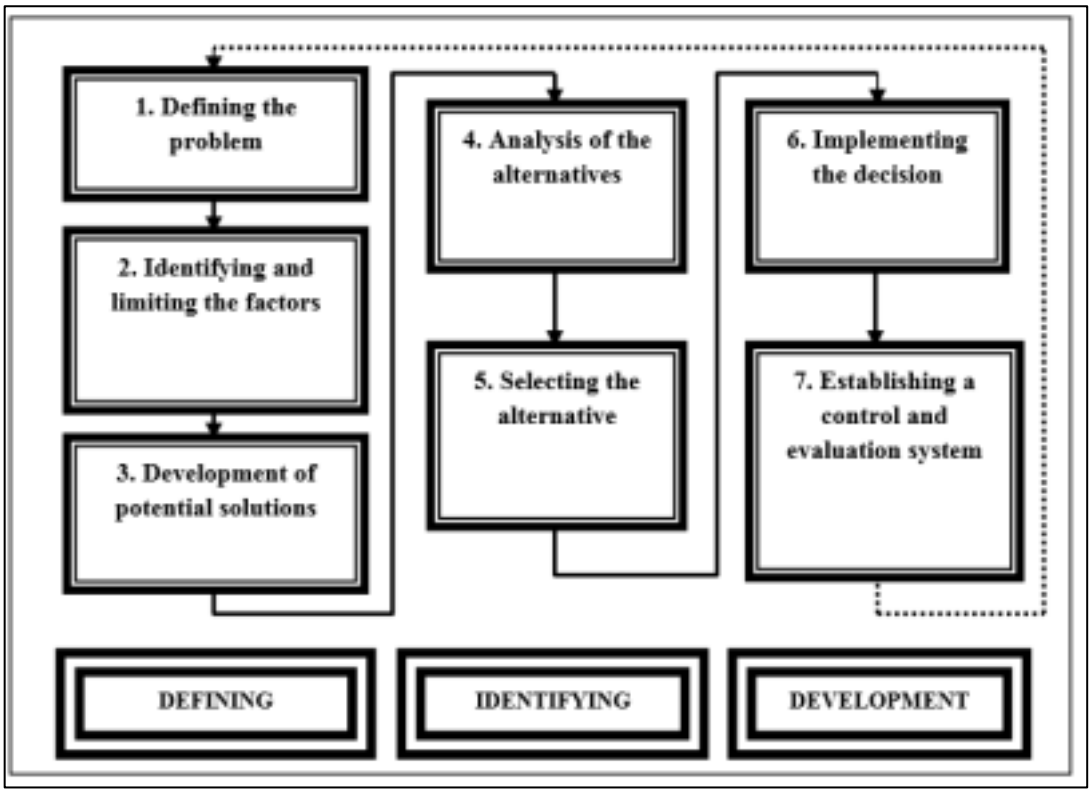


Figure S10: Seven Step Decision Making Model

Source: Negulescu, 2014; Essays, UK. (November 2013). Types of Strategic Decision Making Models. Retrieved on October 31, 2018 from https://www.ukessays.com/essays/business/types-strategic-decision-models-3462.php?vref=1.

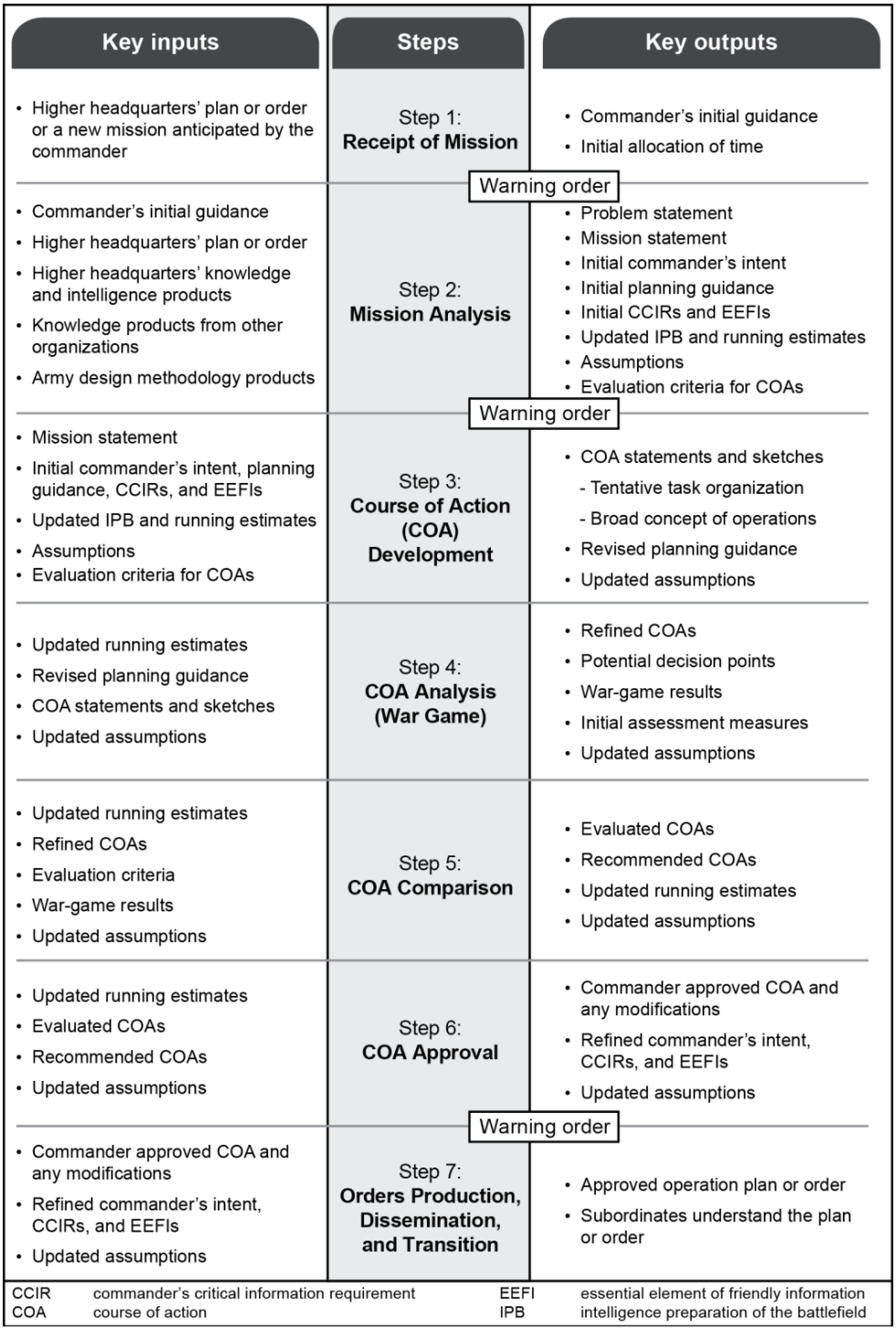


Figure S11: Military Decision Making Process (MDMP)

Source: FM 6-0, 2016, p.9-3.

The decision making models identified above are similar but there are two key differences between the two models. The first difference is that the military model overall is much more comprehensive at each step of the decision making process which takes away any ambiguity amongst the staff. Secondly, step seven of each model is different. The civilian model simply calls for establishing a control and evaluation system while the military model calls for the production of an inclusive set of operations orders in preparation for execution. Although the models vary slightly, they are both great ways to keep an organization focused on the decision at hand in order to make timely and informed decisions for the organization.

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