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Game Assessment For Miltary Application

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GAME ASSESSMENT FOR MILTARY APPLICATION

by

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ABSTRACT

The primary purpose of conducting this research was to establish game assessment guidelines and characteristics for integrating elected characteristics of games into ongoing instructional approaches. The cost of repurposing commercial-off-the-shelf (COTS) games could offer a considerably lower cost alternative than the cost of creating a new instructional game developed for a specific instructional goal. The McNeese Game Assessment Tool (MGAT), created for the assessment of games in this usability study, is currently in a beta stage and was found to have potential for future game assessment. The overall assessment indicated that the tool was effective in analyzing game products for reuse potential and that the five instruments that make up the tool did meet the purpose of the design. However, the study also indicated that the instruments needed recommended modifications and further testing with a larger population group before the tool could be utilized. The assessment process identified in this study was a step forward in the area of game and simulation integration research. This study indicated that more research is needed in the area of instructional design to enhance instructional integration goals for future game, simulation and training applications.

The dissertation is dedicated to the loving memory of my late sister JoAnn Morrison Udud, my mother Jane Louise Waites, and my mentor Dr. Larry Hudson who all passed away before I was able to publish this body of work. I would also like to dedicate this dissertation to my daughter Alexis Lynn Curley D'Valle, to Sarah Guthrie my loving aunt, my sister Charlene Rogers, supporting family and friends. I would like to thank them for all of their love and understanding throughout the years. I know they are all watching with encouraging eyes and whispering "I believe in you!" Without them this publication would have not been possible.

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CHAPTER 1
THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

The primary purpose of conducting this research was to establish game assessment guidelines and characteristics for integrating elected characteristics of games into ongoing instructional approaches. This study combined different assessment methods for the evaluation of games. The approach provided a unique application of assessment that focused on information that supports the utilization and repurposing of commercial-off-the-shelf (COTS) games for military training. The study also provided an assessment product based on instructional guidelines to ensure the effectiveness of games before using them for training purposes in military applications.

Although it is clear that games motivate learners, there has been no evidence that these games relate appropriately to instructional objectives or that they can train students to perform effectively in the field. Instructional objectives for the military relate directly to specific tasks that must be performed with accuracy to ensure the safety of personnel and equipment in actual military jobs. Without ensuring that these games can meet military standards, time, money, and military personnel are at risk. Establishing sound instructional guidelines was important to ensure that games chosen for training would indeed meet military objectives, supporting military standards, and effective training goals.

Future military training programs depend on a tangible process of assessment of COTS games for developmental cost saving and prevention of military fatalities in strategic training exercises. Creating and following a process for adapting games for

military applications was the purpose of this research. This study was intended to assist in defining those integrated guidelines by testing and initiating a process to assess COTS games for military training. The documented process provided in this research was also intended to provide a foundation for future research concerning the use of games for military training.

As a result of the revolution or evolution of game design, the military has increased its use of computer games in training. Since the 1980s, the modern military has demonstrated significant interest in the reuse of commercial games. "Instructional game research began with the introduction of Mech War initiated by Dunnigan in the late 1970s and utilized by the United States Army War College" (Herz & Macedonia, 2002). The present study was designed as a continuous step in the attempt to establish the application of instructional games and define integration guidelines for training.

Expense of Game-Based Training Development for Military Applications

The most important driving factor in this endeavor has been the potential for cost savings to military establishments and massive multiplayer participation by military personnel. Unless, however, military-based games can train to real military objectives using appropriate assessment procedures and repurpose options, it is a waste of government resources to invest in these instructional tools. If repurpose or redesign attributes are indicated for individual games, substantial cost may be required in order to use the games for military training purposes. The design and development of original instructional games requires significant time, personnel, and financial resources, all of which are typically limited for the military and other sectors of society as well. In the

case of military resources, competing needs, i.e., direct support for troops, are always present.

Need for a Systematic Process for Selecting and Repurposing Existing Games

At the time of the present study, a systematic process for assessing COTS games to support military training had not yet been established. According to Tarr et al. (2003), further studies in the area of low-cost PC gaming and simulation research were needed in order to establish assessment guidelines and characteristics for integrating important attributes of games into ongoing instructional approaches. In this study, it was posited that a systematic process is necessary to ensure that selected games meet specified military goals while utilizing the dynamic nature of games to heighten learners' motivation. Evaluating the training effectiveness of games is a primary problem, once they military instructional games have been developed (Hays & Singer, 1989). Without establishing a systematic process for selection and repurposing of existing games, the military would be required to pay high costs for the development of original games and simulators to suit military requirements.

The entertainment industry has taken advantage of technological advances to produce spectacular, realistic graphic displays to create games with increasing sophistication (Lenoir, 2003). Because of this phenomenon the military began to take a serious look at instructional games for military usage. "Consequently, it has become more important than ever to understand how computer games can be used in an effective and efficient manner to induce learning for the armed forces" (Chen, 2003).

Research Question

The research question addressed in this dissertation was focused on the extent to which an effective tool, based on instructional system design methods could be developed for use in assessing games for military endeavors. According to the *Department of Defense Handbook Guidance for Acquisition of Advanced Distributed Learning (ADL) Compliant Products (Part 5 of 5 Parts)* MIL-HDBK-29612-5 (2000), training requirements are to be established and translated into appropriate instructional objectives within the framework of the Instructional System Design (ISD). It has been the most important task in selecting appropriate instructional delivery methods and media. Since games have not been built on military objectives, designing a tool that cross referenced military objectives was an essential part of the tool design process.

Research Method

Typical approaches used in educational research are qualitative, quantitative, descriptive, correlation, causal-comparative, and experimental designs (Gay & Airasian, 2000). Since this particular research was directed toward defining a process, a slightly different approach to the study was indicated. An application case study action research approach seemed to be most appropriate and was selected for use in conducting this research. Usability studies are identified as part of the application case study criterion.

The application case study action research method permits the researcher to summarize and apply a set of complex ideas and/or skills that appear within the case as a relationship to elements within the case (Barbazette, 2004). The case study used for this

research incorporated a logical approach for accomplishing research goals using case study process criteria, survey, and evaluation methods for the usability of a product.

Definition of Terms

The following working definitions will be used for the purpose of this research.

Assessment—"Analysis of the security, effectiveness, and potential of an existing or planned intelligence activity. Judgment of the motives, qualifications, and characteristics of present or prospective employees or agents." A judgment of the effectiveness and efficiency of a training system, in terms of measurement and evaluation (US-DoD, 1996).

Behaviorism—"Based on observable changes in behavior. Behaviorism focuses on a new behavioral pattern being repeated until it becomes automatic" (Mergel, 1998).

Behaviorist--Learning is a relatively permanent change in behavior due to experience. Behaviorism refers to a change in behavior, an external change that we can observe. (Ormrod, 1999)

Case method—"The presentation of real or fictional situations or problems to learners to analyze, to discuss, and to recommend actions to be taken. This is equivalent to instructional scenarios" (US-DoD, 1997).

Cognitive flexibility theory—"A theory of learning for advanced knowledge. Advanced knowledge is seen as less rule-based and rigid than introductory knowledge. The theory recommends approaching content from multiple perspectives through multiple analogies and the use of hypertext instruction" (US-DoD, 1997).

Cognitive psychology--"The scientific analysis of human mental processes and memory structures in order to understand human behavior" (Mayer, 1990, p. 1).

Effectiveness—"A measure of whether a procedure or action achieves its purpose" (US-DoD, 1997).

Entry behavior--The knowledge and skills students have when they enter a course of instruction (US-DoD, 1997).

Entry level training—"Training given on initial entry into the Army which provides an orderly transition from civilian to military life. For enlisted soldiers it includes traditional basic combat training, advanced individual training, one station unit training, or other individual training needed to prepare them for initial duty assignments. Officer entry level training includes MQS I and MQS II (officer basic courses) to prepare them for their first duty assignment. *Note*: MQS products will be phased out upon replacement by OFS products" (US-DoD, 1997).

Entry skills—"Specific measurable behaviors determined to be basic to learning material presented in the course" (US-DoD, 1997).

Entry skills test—"A pre-test designed to determine if a student possesses prerequisite skills or knowledge before undertaking new instruction" (US-DoD, 1997).

Entry test—"A test on the objectives that the intended students must have mastered in order to begin the course. Note the distinction between *entry test* and *entry skills test"* (US-DoD, 1997).

Environment analysis—"The context of any instructional system, both where the instruction will occur and how the instructional materials will be used" (US-DoD, 1997).

Evaluation functionsAssessments, such as After Action Reviews, score accumulation, or advancement to the next level of the game that determine the outcome of an event.

Events—"Discrete points in a game where the game state changes. Events usually occur as the result of player actions, but can also be the result of trigger events such as elapsed time" (Game, 2006).

Fidelity—"The degree of similarity between the gaming or training situation and the operational situation which is simulated" (Hays & Singer, 1989).

Fidelity in Graphics—"A quality that enables high color space through the multimedia processing pipeline, which enables high-definition scenarios" (Microsoft Corporation, 2006).

Formative evaluation—"On-going evaluation of instruction with the purpose of improvement" (US-DoD, 1997).

Functional context training—"A model of instruction that works from simple, familiar tasks and proceeds to more complex tasks with ample opportunities for practice" (US-DoD, 1997).

Game"An artificially constructed, competitive activity with a specific goal, a set of rules, and constraints, located in a specific context" (US-DoD, 1997).

Interaction"A cyclical or iterative process that takes place in training systems, having four basic phases: training needs analysis, training program design, training program implementation, and training program evaluation" (US-DoD, 1997).

Instructional design—"The activity of planning and designing for instruction. Also, a discipline associated with the activity" (US-DoD, 1997).

Layers of necessity model—"A model of instructional design and development which prioritizes the needs of a project into layers; "each layer being a self-contained model." Additional layers are developed as time and resources allow" (Tessmer & Wedman, 1990, p. 79).

Micro world—"A computer-based simulation with opportunities for manipulation of content and practice of skills" (Microsoft Corporation, 2006).

Minimalist training—"An instructional approach which seeks to provide the minimum amount of instruction needed to help the learner master a skill. It emphasizes active learning and meaningful learning tasks" (US-DoD, 1997).

Model—"A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process" (US-DoD, 1997).

Performance analysis—"A specific, performance-based needs assessment technique that precedes any design or development activities by analyzing the performance problems of a work organization" (US-DoD, 1997).

Performance—"Those operational and support characteristics of the system that allow it to effectively and efficiently perform its assigned mission over time. The support characteristics of the system include such supportability aspects of the design and the support elements necessary for system operation. Part of a criterion objective that describes the observable student behavior (or the product of that behavior) that is acceptable to the instructor as proof that learning has occurred" (US-DoD, 1997).

Performance checklist—"The breakdown of a learning objective into elements that must be correctly performed to determine whether each student satisfactorily meets the performance standards described in the learning objective" (US-DoD, 1997).

Performance criteria/standard—"Part of a learning objective that describes the observable student behavior (or the product of that behavior) that is acceptable as proof that learning has occurred" (US-DoD, 1997).

Performance deficiency—"The inability of a unit or individual to perform required tasks to the established standard" (US-DoD, 1997).

Performance evaluation—"A process of data collection and analysis to determine the success of students on learning to perform a specific learning objective, individual, or collective task to the established standard as a result of a training program" (US-DoD, 1997).

Performance evaluation tools—"Competency tests that allow the trainer to profile the student's proficiency and identify weak areas so that training can be efficiently planned for the areas of most critical need" (US-DoD, 1997).

Performance exercise—"A proficiency (criterion- referenced) test used to evaluate mastery of a task as specified by the criterion-referenced objective" (US-DoD, 1997).

Performance gap—"The delta between desired and actual performance" (US-DoD, 1997).

Performance measures—"The actions that can be objectively observed and measured to determine if a task performer has performed the task to the prescribed standard. These measures are derived from the task performance steps during task analysis" (US-DoD, 1997).

Performance objective—"A precise statement of the performance expected of a student as the result of instruction, expressed in terms of the standards to which it will be performed or demonstrated" (US-DoD, 1997).

Performance oriented training—"Training in which learning is accomplished through performance or the actual doing of the tasks or supporting learning objectives under specific conditions until an established standard is met" (US-DoD, 1997).

Performance requirements—"The identification of the separate acts that are required to satisfactorily complete an individual's performance on the job. It includes the act (behavior), the conditions under which the behavior is performed and the standard of performance required by the incumbent" (US-DoD, 1997).

Performance specification—"A statement of requirements, in terms of the required results with criteria for verifying compliance, without stating the methods for achieving the required results. A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics" (US-DoD, 1997).

Performance step—"A single discrete operation, movement, or action that comprises part of a task" (US-DoD, 1997).

Performance test—"A test of actual performance of an established criterion, such as a lesson learning objective, to determine if a student can perform the action under the prescribed conditions, to the established absolute standards. *Example:* Replace the gas mask canister on your M40-series protective mask" (US-DoD, 1997).

Performance-based instruction—"Instruction that develops student performance proficiency via task-based learning objectives written with an action verb. Students prove

competency by actual performance of the objectives to the established standards" (U.S. Department of Defense, 1997).

Performance-based test—"A test to determine if a student can perform the learning objective (the criterion) to the established standard without demonstrating actual performance. Also called *performance-oriented* or *simulated performance testing*. Example: Based on simulated operational conditions, place the correct unit symbols in the proper location on a map overlay" (US-DoD, 1997).

Performance-oriented training—"Training in which learning is accomplished through performance of the tasks or supporting learning objectives under specific conditions until an established standard is met" (US-DoD, 1997).

Problem solving—"The creative application of various rules, procedures, techniques, or principles to solve complex problems where there is no single correct answer" (Tessmer, Jonassen, & Caverly, 1989).

Rapid prototyping—"In a design process, early development of a small-scale prototype used to test out certain key features of the design. Most useful for large-scale or projects" (US-DoD, 1997).

Scaffolding—"A technique of cognitive apprenticeship whereby the instructor performs parts of a task that the learner is not yet able to perform" (US-DoD, 1997).

Simulation—"A model of real-life scenarios that a student must act upon within a game to produce realistic and effective training based on facts" (Tessmer et al., 1989).

Simulation games—"Repeated simulations of a model through a closed-loop process that the learner gradually builds an understanding of the simulated system" (Simons, 1993).

Spoon-feeding problem—"The dilemma in training between (1) how much to simplify and control the learning situation and (2) how much to provide for exploration and exposure to real-world complexity" (US-DoD, 1997).

Training—"Instruction which emphasizes job-specific, near-transfer learning objectives; traditionally skills-based instruction, as opposed to education" (US-DoD, 1997).

Training Device--"An arrangement of equipment or materials that simulates the actual task environment and provides functional interaction by the trainer" (US-DoD, 1997).

Triggered EventThe point in a game or simulation in which the program triggers a scoring calculation to document progress or failure. It is also an externally-triggered event that represents a start of the creation of new knowledge. "A triggered event is defined in connection with a user's activity conditions and an organization's loop events" (Hayashi, Tsumoto, Ikeda, & Mizoguchi, n.d.)

Overview of Empirical Foundations

In a study conducted by Randel, Morris, Wetzel, and Whitehill (1992), a greater retention of skills and knowledge was demonstrated for information learned in games.. Games were also found to help learners in problem-solving activities (Dempsey, Lucassen, Gilley, & Rasmussen, 1993-1994). Attributes associated with instructional system design, created for military simulators, have had similar game design qualities. According to Hays and Singer (1989), it was because of these similarities that games have been endorsed for military training. The research indicates that because of these

benefits games can be used to measure entry level performance, quantify criteria, support in formative and summative evaluations, provide specific knowledge and skills, help maintain skills, illustrate abstract principles, and motivate learners. Each of these attributes will be described in detail in the next section.

Assessment of Entry Level Performance

"Entry level performance measures are specific behaviors determined to be basic to learning material presented in a course." As illustrated in the Department of Defense Army Regulations (1996), assessment of entry-level performance has been a top priority in military training. These regulations have set forth policy and provided guidance for the separation of personnel because of unsatisfactory performance or conduct (or both) while in entry-level status. In reference to the assessment of entry-level performance in military games, entry-level performance must be established as a top priority and criterion used in the assessment of effective instructional gaming design. Assessment of COTS games must address this issue so that military objectives are the established precedent for procedural analysis.

Gagne (1985) suggested that "learning tasks for intellectual skills can be organized in a hierarchy according to complexity: stimulus recognition, response generation, procedure following, use of terminology, discriminations, concept formation, rule application, and problem solving. The primary significance of the hierarchy was to identify prerequisites to assess entry-level performance that should be completed to facilitate learning at each level. Learning hierarchies provide a basis for the sequencing of instruction." Hierarchies have also been used in the development of games. Thus, the

importance of assessing entry-level performance has been essential in identifying COTS games for military usage. The entry-level requirements were important in determining if the COTS game addressed military standards and objectives. The entry-level requirements were also important in establishing the instructional baseline for the instructional training needs.

Learner Motivation

"Motivation is the need or desire that determines an individual's effort, behaviors and actions" (Business Study Solutions, 2005). "Most motivation theorists assume that motivation is involved in the performance of all learned responses; that is, a learned behavior will not occur unless it is energized" (Huitt, 2001). "Video games seem to motivate students to experience academic tasks and contexts that cause or encourage pleasant emotions. Students who use instructional video games should be able to feel enthusiasm, excitement, or enjoyment in their learning context rather than being in a context that causes anxiety, disappointment, or anger" (Ormrod, 1999).

Using emotions to motivate learners in a game is called emotioneering. "Emotioneering is a vast body of techniques that can create, for a player or participant, a breadth and depth of emotions in a game or other interactive experience, or that can immerse a game player in a world or a role. The goal of emotioneering is to move the player or student through an interlocking sequence of emotional experiences" (Freeman, 2004).

"There is interplay between emotions and learning, but this interaction is far more complex than previous theories have articulated" (Kort, Reilly, & Picard, 2001).

"Feelings and emotions are associated with various levels of failure or success and are a normal part of learning." Feelings and emotions can actually be helpful signals in identifying better learning techniques, and their use in instructional games can increase learning potential. The graphic displayed in Figure 1 could be used to provoke an emotional response. If the student relates to either one of the male figures in the graphic, jealousy or anger may come into play in a military scenario situation. The learning tool provokes emotions that could affect individuals in combat game play.

The Principle of Emotional Activation suggests that activation of appropriate emotions will facilitate motivation by providing simulations that emotionally involve students in an experience (Pintrich & Schunk, 2002). The principle indicates that motivation can contribute to positive or negative instructional outcomes according to individual responses dictated in design attributes.

From Freeman Games Web Site: (http://www.freemangames.com/idea/6_4.php , 2006), Illustration by Jeff Carlisle.

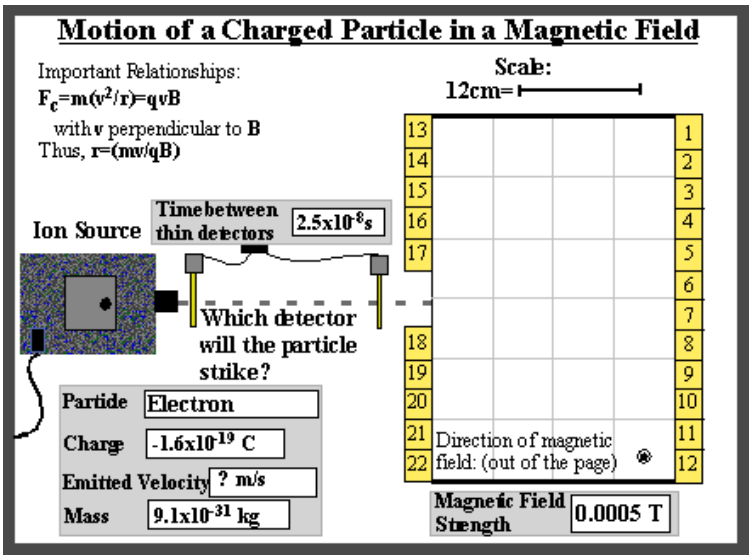
Figure 1. Example of using emotional graphics to invoke learning.

Csikszentmihalyi (1985), in studying individuals who engaged in intrinsically motivating activities, found that their experiences reflected complete involvement with the activities. “What is captivating about games, for players, tends to be their structure rather than their content. Structure involves dynamic visuals, interaction, and the presence of a goal and rules that govern play. The key to motivation is winning while remaining challenged.” As described by the British Educational Communications and Technology Agency (2005), “game playing can be thought of as intrinsically motivating, and the motivations for playing include the challenge, fantasy, curiosity, and control that games afford.”

Illustrating Abstract Principles

Animations, films, and videos are techniques that have often been used in game design. The illustrated abstract concepts and principles involving motion (Heinich, Molenda, & Russel, 1993). Scott (2003) stated that animations are designed to provide an additional instructional mode to help students gain an understanding of how certain systems evolve with time. Dramatizations of an abstract concept often present a complex or sophisticated treatment of an issue. “An example of this is the motion of a charged particle in a magnetic field. Moving charged particles cannot be seen directly with the naked eye, and they usually move at speeds that seem instantaneous to human perception.” Figure 2 provides an example of this premise. By animating charged particles and viewing them in slowanimated motion, students can begin to understand the complexity of the behavior of a charged particle and still apply physical concepts to

calculate its path Using animation in games is a continuous part of game design and can be used to easily demonstrate abstract concepts and ideas.



From University of Wisconsin Web Site: (http://physics.uwstout.edu/staff/scott/animate.html, 2006)

Figure 2. Example of an abstract concept.

Providing Specific Knowledge and Skills

Games and simulators can provide specific knowledge and skills designed for military objectives. Knerr, Simutis, and Johnson (1979) have claimed that the explicit delineation of task skills and knowledge is even more important when combined with specific training. It is important because errors in skill and knowledge could contribute to negative transfer of training. Ensuring that COTS games incorporate military objectives is important in order to limits errors in knowledge transfer. If COTS games cannot provide the necessary skill sets for individual and military training needs, the game must be repurposed or discarded as an instructional tool for military training objectives.

Drill and Practice as a Teaching Strategy

According to behaviorist theory, "drill and practice provide for the repetition of stimulus response habits that can strengthen those habits" (Ormrod, 1999). Games and simulators provide a practical application using drill and practice in the pursuit of knowledge transfer. Drill and practice techniques are designed to teach basic skills and are used as such in military training. "Practicing or rehearsing improves retention, especially when it is distributed practice. By distributing practice, the learner associates the material with many different contexts rather than the one context afforded by mass practice" (Mergel, 1998). Thorndike (1913), in his law of exercise, stated his belief that the repetition of an experience increased the probability of a correct response. In designing a process of assessing COTS games, it is important to include drill and practice attributes as part of the process of evaluation.

Help Maintain Skills

Consistency is one of the most important items in learning and in maintaining previously learned skills. Establishing consistent approaches to collective and individual training helps in maintaining previously learned skills and provides a foundation for the design of hierarchical mastery skill sets. Collective training should be conducted at a baseline proficiency level consistent with military readiness standards (Bott, 1995). The ability to retain information over long periods is fundamental to intelligent thought and behavior (Richardson-Klavehn & Bjork, n.d.). The natural phenomenon of forgetting is a critical training problem which has been cited by the Department of Defense U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) (2006). ARI has

indicated that unpracticed tasks will typically be forgotten over a one-year interval. Therefore, simulators are used for the specific purpose of maintaining critical skills in military training. At the time of this research, Air Force trainers were using flight simulator games as a way of maintaining pilot flying skills. These actions used in training support Thorndike's theory and provide a cognitive foundation for using repetition in the design of instructional games for military training scenarios. Thorndike (1913) also stated that transfer from one situation to another was dependent on identical elements present in the original situation, which could be transferred to a new learning situation, thus making learning easier and establishing a consistent approach to maintaining previously learned skills.

Significance of the Study

During the frenzy to stay ahead of the advances in technology, several instructional games were designed for military application. These games recruit, as well as train, new Navy and Army personnel. "There has been a growing endorsement for using instructional games for military training because of their capability to assess entry level performance, measure criteria, support formative and summative evaluations, provide specific knowledge and skills, help maintain skills, illustrate abstract principles, and motivate learners" (Hays & Singer, 1989). "The military has recognized the importance of commercial entertainment technology with the creation of the Institute of Creative Technology. The Institute brings together defense and commercial industries to produce integrated simulation and game products." According to Herz and Macedonia (2002), "the objectives of the Institute have been revolutionary in determining how the

military trains and rehearses for upcoming missions in preparation for the challenges of the 21st century."

History of Military Application of Games

The birth of military wargames began in 1824 when an innovative father and son team demonstrated the game *Anleitung zur Darstelling militarische manuver mit dem apparat des Kriegsspiels (Instructions for the Representation of Tactical Maneuvers under the Guise of a Wargame)* to Prussian Prince Wilhem. After viewing the game, a Prussian Army General proclaimed that "the invention was not a game but was a training strategy for war. The game included a number of new innovations, the most important of which were the use of actual topographical maps to portray the battlefield and rigid rules which specifically quantified the effects of combat." Thereafter, all Prussian regiments had their own game sets to be used in training (Gray, 1995). As technological development of games progressed, so did the application of games used for military training. Early military games included die rolling to determine results of battles for German military training in which topographical maps and die cast toy soldiers were used to teach battle scenarios.

In 1876, war games were introduced to the United States Naval War College in Newport Rode Island. The college produced a ship-on-ship game to teach tactical and strategic maneuvers. Fleet Admiral Chester A. Nimitz proclaimed "the American's naval victory over Japan happened because the war had been reenacted in the game rooms at the Naval War College by so many people and in so many different ways that nothing happened during the war that was a surprise with the exception of the kamikazis towards

the end of the war." "It is not surprising, therefore, that military war games followed advances in technology, resulting in the complicated pilot simulators and computerized strategic systems used around the world today" (Gray, 1995).

The High Cost of Design and Development

Given the importance of the development of simulators and computerized strategic systems for use in military training endeavors and in support of actual war efforts, it is not surprising that the development of original instructional games has not been a high priority for the allocation of funding. The design and development of original instructional games have required significant time, personnel, and financial resources. According to Lenoir (2003), the U. S. Army spent $8 million in creating the operations game, America's Army (See Figure 3).

Figure 3. America's Army Log and Web Site: (http://www.americasarmy.com, 2006)

Although the cost of creating an advanced commercial game engine with brilliant graphics was high, the game was considered a great success with 400,000 downloads of the game on the first day it was released. Since the cost of using COTS games has been shown to be considerably lower than the cost of creating a new instructional game developed for a specific instructional goal, COTS games needed to be analyzed to assess how many military objectives and tasks they address. It was assumed that COTS games

could potentially address more than one purpose and that they could be used for training purposes in multiple military organizations. Although this study was concerned only with Navy objectives, the analysis process could be used by many organizations.

Alignment of Military Objectives with Game Objectives

Alignment of military objectives with COTS gaming objectives was a primary focus of this dissertation. If a game cannot support military objectives, the game cannot be used for military training. To use any of the COTS gaming products that incorporate military content, it was essential that the games be assessed for their supportability of military objectives. According to Hays (2005), when an instructional product does the job it is designed to do, i.e., meets its instructional objectives, the product should be able to provide effective training. If each objective for each game is analyzed and cross-referenced to the Naval Tactical Task List (NTTL), a comprehensive analysis of the product can be produced and assessed for military supportability. If the game supports military training objectives, then it should be able to be used to produce effective training outcomes.

The NTTL is a comprehensive task list that provides the Navy/Coast Guard with a systematic approach to training; it identifies mission-based tasks associated with Navy/Cost Guard objectives with an emphasis on the Commander, Fleet Forces Command Navy Warfare Training Systems (NWTS). A practical approach was used to identify game objectives with the list. Learner outcomes and content attributes were also examined for correlation indicators in a matrix developed specifically for the purpose of processing the information. The NTTL matrix also included suggested game style that

correlated with the Social Impact Game website matrix, Gagne's different learning level content attributes, and Bloom's Taxonomy.

Repurposing Existing Games: A Possible Solution?

To reduce costs, the military has been repurposing existing entertaining COTS games for military application (Chen, 2003). Burgos, Tattersall, and Koper (2005) "described digital games and simulations as having a number of features that make them advisable for use in learning processes." Generic games can be repurposed from their original goal to support a learning objective inside a pedagogical context. Crawford (1984) stated that "focusing on objectives and the nature of the game" during the repurposing process is important. Burgos, Tattersall, and Koper stressed "the importance of interoperability so that lesson plans that result from repurposed games can be more easily shared by instructors and can be used in different e-learning platforms and environments as part of a fully integrated learning flow." A suggested approach has been to repurpose generic games, contained as isolated stand-alone modules, inside a learning structure. The simplicity of this type of integration is its biggest advantage, and any generic game could be repurposed with further modification. The research process of this study was intended to pinpoint the exact point of modification using a repurpose indicator design. The possibility of repurposing existing games and simulations in a educational scenario provides a new pedagogical use in e-learning environments. Though future game research may focus on developing a software patches that can connect external module, game, or simulation systems. The purpose of the present research was to identify suitable

games that focused on military objectives and supported military tasks for the assessment process.

At the time of the present study, there was growing interest in the use of instructional games for military training; however, processes for (a) evaluating games for supportability of military objectives and (b) assessing games for repurpose indicators did not exist. To meet this need, an evaluation process was developed and tested. In this process, military objectives supportive of training requirements were linked to gaming objectives.

Summary

"For over two decades, the military has demonstrated interest in commercial games" (Herz & Macedonia, 2002). The rationale for developing a process for evaluating COTS game content and objectives for military training has been documented in prior research. This research was conducted to develop and test an assessment tool suitable for use in the evaluation process. The most important factors in developing an evaluation process and tool have been determined to be (a) cost savings to military agencies, (b) the need for effective military training alternatives, and (c) the efficacy of massive multiplayer participation by military personnel. Military-based games must however, train to real military objectives and assessment procedures and repurpose options must be explored. This study was an important attempt to establish a foundation for future gaming assessments and procedures.

Organization of the Study

Chapter 1 has provided an overview to the study and an introduction to the problem. Chapter 2 presents a review of the literature relevant to the study. Chapter 3 contains the methodology used in conducting the study including the development of instrumentation, data collection and analysis. Chapter 4 presents the data analysis. Chapter 5 provides a summary and discussion of the findings as well as recommendations for future research.

CHAPTER 2
LITERATURE REVIEW

Introduction

A literature review in the area of simulation and game research for military applications was performed to support and validate the need for an analytical process in the area of game applications for military endeavors. The review focused on the instructional effectiveness of games, repurposed games, and the integration of games and simulation. In addition, an extensive Internet search was conducted and researchers in the instructional games field were contacted to obtain further supportive literature and research, both published and in progress. This literature review provided the foundation for the case study described in this dissertation. It also served as the basis for designing an analytical process, drawing conclusions, and providing recommendations.

Hays (2005) wrote a technical report in which he reviewed the literature on the effectiveness of instructional games. Hays' report was instrumental in establishing the foundation of this research. Hays cited many of the same books, papers, and articles in his research that have been cited in this study. The technical report issued by Hays provided insight into the process for developing a comprehensive procedure for the analysis of instructional games for military applications.

Over 1,000 documents were retrieved and evaluated for relevance to the topic of this dissertation. Search topics included (a) instructional theories; (b) gaming theories; (c) design, purpose, application, and evaluation of games; and (d) simulators. Gaming theory and instructional design publications were included for cognitive

foundation reasons. Publications, web sites, and articles needed to be relevant to military training, repurpose indicators, or effectiveness of instructional games and/or simulation in order to be included in the literature review. Also, documents providing only authors' opinions were excluded from the review.

Background of the Study

Game Theory

In order to gain a thorough knowledge of how games work, in-depth research was conducted in the area of game theory. Zagare's (1984) comprehensive text on the subject was most helpful in better understanding gaming theory attributes as relevant to the gaming research being conducted.

To understand if games could be used for military applications and if they could be related to the Naval Tactical Task List (NTTL), a thorough understanding of how games work and how gaming trees are developed was essential. Gaming trees are based upon reactions within a game and player choices. If a player chooses a particular action, the outcome is calculated; the next action is built upon the next choice which leads to gaming scenarios. The research in this area provided a solid foundation for understanding the task associated with the research and illustrated abstract concepts in an exceptional way. The gaming tree is an essential feature of games. According to Zagare (1984), it reflects symbolic consideration of strategic situations for extracting outcomes that are based on predictions and the structural complexity of the game. In addition to examining gaming trees, this aspect of the literature review provided information on the initial use of

games for military applications. The design of these military strategic games were base on real-life events designed around 1967 for the Middle East Crisis as indicated by Zagare (1984).

Working Definition of a Game

Since this research dealt with instructional games, having a working definition of a game was an important aspect in the understanding and development of a comprehensive assessment process. Many documents reviewed described games; however, several of the documents reviewed were very comprehensive in their definitions. Hays (2005), indicated that "A game is an artificially constructed, competitive activity with a specific goal, a set of rules and constraints that is located in a specific context" (p. 11). Roblyer (2006) defined "instructional games as software designed to increase motivation by adding game rules and/or competition to learning activities." Roblyer also stated that instructional games should be examined carefully for their value as both educational and motivational tools. This further justified the need to develop a process of assessment for military applications.

Types of Games

A matrix describing content, examples, learning activities and possible game styles was found on The Social Impact Games website (socialimpactgames.com). The different types of games provided a foundation for exploring and discovering game styles and game classifications. Leemkvil, de Jong, and Ootes (2000) and Bright and Harvey (1984) discussed several characteristics of games. According to these authors, "all games

include voluntary play, some goal state that must be reached, constraints and rules, and competition specific to context." " The "Folk Model" divides games into four (nonexclusive) categories: games of skill, games of chance, games of strategy, and simulation games" (Mish, 1993). Anderlini, Gerardi, and Lagunoff (2006) described the "Folk Model" or "Folk Theorem" as a stage game that is repeatedly played by successive generations of short duration players with dynastic preferences.

The Social Impact Games website portrays the following game styles: game show competitions, flashcards, mnemonics, action, adventure, sports, role-play, detective, multiplayer interaction, strategy, construction, reality testing, puzzles, timed, reflex, invention, concentration, and simulation games. Each of these game styles has been associated with different types of content and learning activities. The common thread between the Social Impact Games website and the authors referenced in this section was the belief that all games contain rules specific to content. Content developed for specific military objectives has been a driving force for the development of military instruction. Therefore, the most logical step in creating an assessment of instructional games designed for addressing military training needs--especially action, adventure, roll-play, reality testing, strategy, and simulation games--was to design a matrix with an emphasis on content.

Instructional Games

In researching the definition of games, it was discovered that most definitions did not include reference to instruction. Jacob and Dempsy (1993) described instruction as a specific type of interaction between the learner and the instructional material. To control

the learning experience was an essential feature of instruction according to Hays (2005). Hazzard (2006) discussed Bruner's beliefs "that students learn best by discovery and that the learner is a problem solver who interacts with the environment by testing hypotheses and developing generalizations." Bruner (1960), viewed "the goal of education as intellectual development or fostering the development of problem-solving skills through inquiry and discovery." Hays (2205) indicated that "few articles contained documented empirical data on the effectiveness of instructional games." It would seem that Hays was looking for concrete evidence based on a controlled learning experience. Since instructional games should be based on the cognitive development of problem-solving interaction skills using graphical stimulus, it makes sense that little empirical data has been documented about the effectiveness of instructional games. Even though the effectiveness of instructional games was not the focus of this research, it is evident that much research is still needed to further substantiate the use of instructional games for military applications.

Research on Games for Training and Education

To ensure the quality of this literature review, it was essential to review literature related to the effectiveness of instructional games. Hays (2005) described in detail the effectiveness of instructional games within a literature review. Hays' report was instrumental in establishing the foundation for this research and providing essential formats for the instruments used in this study. Hays' previous work provided the first steps in developing a comprehensive procedure for this study.

Ahdell (2001) conducted research for a master's thesis that addressed content similar to that addressed in the present research. Ahdell's research provided a good foundation for gaming and simulation integration products and the alignment of content with learner needs. Ahdell also used a similar approach to that taken by this researcher by conducting three case studies on games designed for corporate use. Ahdell did not, however, arrive at definitive conclusions as to the effectiveness of the games used in these case studies in terms of learning. Based on his research, Ahdell stated that games and simulations spark interest for learning that make boring topics fun and games were well suited for learning content that requires practice. He stressed the importance of relevant content and design to maintain engagement throughout the learning process and ensure effective learning. Ahdell also commented that game attributes could be considered in designing a practical approach for assessment.

Games used for Learning

Leemkvil, de Jong, and Ootes (2000) and Bright and Harvey (1984) discussed different types of games that provide a foundation for exploring and discovering game styles and game classifications. According to these authors, all games include voluntary play, some goal state that must be reached, constraints and rules, and competition specific to context. The "Folk Model" divides games into four (non exclusive) contexts. The Social Impact Games website portrays the following game styles: game show competitions, flashcards, mnemonics, action, adventure, sports, role-play, detective, multiplayer interaction, strategy, construction, reality testing, puzzles, timed, reflex,

invention, concentration, and simulation games. Each of these game styles is associated with different types of content and learning activities.

Repurposing Commercial-Off-the-Shelf (COTS) Games

During the course of the research there was not a lot of literature on repurposing commercial-off-the-shelf (COTS) games. However, in a paper written for the 2005 Winter Simulation Conference by the Army Research Laboratory, many difficulties were presented in repurposing COTS games. Warren, Diller, Leung, Ferguson, and Sutton (2005), described "a problem in not having access to the underlying source code which often made it difficult to add new features to games identified as needing repurposing to meet military goals." The more a game needs to be repurposed the higher the cost. This study was designed to identify that particular gap. In the product designed for this study the higher the overall assessment numbers the better the indication that a game could be repurposed for military training needs. Due to the rising cost of development on instructional games it is difficult to predict cost factors. However, if a game does have repurpose potential then a more in-depth cost analysis is warranted. If a game has very little repurpose potential then the military can move on to another product without wasting valuable time and money.

Summary

Different avenues of research were investigated in the context of this study. Game theory was an important concept to research to provide a cognitive foundation and an understanding to how games work. The gaming tree explanation provided a logical path

into the discovery of a possible instructional link with naval objective attributes. Hays' (2005) work provided a solid definition of a game and Roblyer's (2006) work provided insight into defining instructional games. Roblyer defined different types of games and provided a full explanation of how instructional games function.

Exploring pre-existing literature was necessary to provide concrete evidence that developing a process for the assessment of instructional games for military endeavors was essential if the military is to use games for future military training. In summary, background information provided the knowledge base for understanding games and for developing an assessment process for reviewing commercial-off-the-shelf (COTS) games for military training.

Analysis Procedure Research

Human Factors

There has been increasing awareness of the importance of human factors in the design of computer-user interfaces. "Only recently has attention been paid to the human factors associated with electronic games which are likely the most common types of human interaction with computers" (Allen & Breckler, 1983). According to Allen and Breckler, designing an analytical procedure, giving forethought to how the learner interacts with the computer, and guiding a student successfully through a game are essential qualities leading to retention of the given material. They also identified as important in the area of human factors, a user interface criterion that deals with how a learner is shown the structure of the game content and whether the game designer

provides tutorials and instructions on how to move about the game and operate the controls.

Incorporating human factors into game design should be one of the primary goals of the designer, and a measure to evaluate human performance was included in the evaluation criteria design in the present research. The information for this criterion was devised from Hays' technical report (2005).

Evaluation and Quality Training Tools

In developing assessment and procedure tools for this dissertation, the Hays, Stout, and Ryan-Jones (2005) report provided a solid foundation for the development of an analysis matrix in the assessment of games for instructional usability. Even though this report was written for computer and web-delivered instruction, the information transferred nicely to the development of assessment procedures for the purpose of this research. The report was comprehensive in describing the need for a quality product for Navy instructional applications. Several of the criteria matrices were used and repurposed for the current study.

PC-Based Courseware and Team Training

Oser (1994) described guidelines for conducting team training using interactive, PC-based courseware. This author provided four approaches or components needed for effective team training: information, demonstration, practice, and feedback. The author indicated that while his paper focused on aircrew training, the guidelines were applicable to team training in a variety of areas outside the aviation arena. He claimed

that there were advantages to interactive courseware (ICW) such as cost reduction, standardized training, fewer instructors, and self-pacing by the learner. PC-based programs provided a wealth of information and are in formats that were readily digested by the learner and that allowed skill demonstration using a variety of media. Practice using a PC-based system was also accomplished using scenario driven (simulation-based) formats. The scenario based formats lent themselves easily to a gaming format as described by Zagare (1984). While not explicitly stated, Zagare indicated there were limitations in the PC-based training approach due to restrictions on both physical and functional fidelity levels that can be incorporated within a low-cost training environment. A well-designed game also tackled the functional fidelity problem. A major benefit of PC-based training was the ability to track performance over time and, thus, provide useful feedback. The tracking feature was also part of the design of games suggested by Zagare. What was not stated in the document was the potential limitation regarding tracking team communication. This was a key skill area critical for success depending on the task/situation.

Zagare (1984) described ongoing work to incorporate PC-based ICW to enhance team training, especially for training crew coordination skills of helicopter aircrews. Multiplayer games also addressed team play as reported by Zagare (1984) and supported the concept of repurposed games for military applications. The information found in the literature review provided basic guidelines in defining the assessment structure for this study. Zagare's and Oser's (1994) earlier work was supported by the analysis procedures described by Hays, Stow, Ryan-Jones (2005) in their discussion of quality evaluation tools.

Social Impact Games Matrix

The Social Impact Games (2006) website provided a method for approaching the process of accessing and associating games with simulators, instructional design concepts, and instructional theories. The "Design Advisor: Type of Learning /Possible Games" page of this web site associated types of learning with (a) content, (b) examples (c) learning activities, and (d) possible game design. It was apparent in the review that these content and learning activities were closely associated with Gagne's (1962) conditions of learning and Bloom's Taxonomy (Bloom, 1956). A review of the work of these two theorists provided common content and a comprehensive foundation to support the present research and the design of assessment instruments.

Gagne's Conditions of Learning Theory

The content area represented in the online matrix in the Social Impact Games (2006) website resembled many of the same attributes that Gagne (1985) described as learning levels in his theory of conditions of learning. Gagne's earlier work (1962) had demonstrated a concern for different levels of learning as related to military training. Gagne also elaborated on "the analysis of learning objectives and related different classes of learning objectives to appropriate instructional designs." " He introduced the idea of task analysis to instructional design. Through task analysis, instruction can be broken down into sequential steps--hierarchical relationship of tasks and subtasks" (Seels, 1989). "Gagne also has been a central figure in the infusion of instructional psychology into the field of instructional technology." Incorporating and associating Gagne's content attributes with the Social Impact Games (2006) content provided a solid cognitive

foundation for the study. It was only logical to develop a matrix that combined and associated the work of NTTL, Bloom's Taxonomy, and Gagne's work into one assessment tool.

Bloom's Taxonomy of Educational Objectives

Gagne's differentiation of psychomotor skills, verbal information, intellectual skills, cognitive strategies, and attitudes provided a companion to Bloom's (1956) *Taxonomy of Educational Objectives for the Cognitive Domain*. The taxonomy is extremely valuable in providing specifications for the analysis of instructional outcomes. Bloom (1956) "identified three domains of educational activities: (a) cognitive domain, (b) affective domain, and (c) the psychomotor domain."

According to Seels (1989), "the cognitive domain involves knowledge and the development of intellectual skills. This includes the recall or recognition of facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills." The content attributes discovered while researching Bloom's (1956) Taxonomy were aligned with the information described in the Social Impact Games (2006) website. The knowledge attribute of Bloom's work described recall data or information, key words associated with Gagne's (1962) definitions. "These key words include the following: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, and states" (Clark, 2001). These verbs refer to observable student behavior or performance and they are appropriate for use in creating objectives. Bloom's Taxonomy typically has been used in creating behavioral objectives, learning objectives, instructional objectives, and performance objectives.

Since providing a comparison of gaming objectives to naval objectives was a vital part of this study, Bloom's verbs were essential in developing an assessment matrix as part of the research methodology used in the conduct of the study.

Content Attributes and Learner Needs

Content verbs comprised one common thread among the Social Impact Games (2006) website, Gagne's (1988) work, and Bloom's (1956) Taxonomy. These verbs connect learner outcomes with objectives and gaming styles. By connecting these key elements, a logical process was able to be developed for the assessment of COTS games for military applications. The content attributes were facts, skills, judgment, behaviors, theories, reasoning, process, procedures, creativity, language, systems, observation, and communication that relate to learner outcomes. These outcomes included motor skills, cognitive strategies, problem solving, rules, verbal information, and discriminations. The assessment and development of a sound analysis process for COTS games for military applications can be achieved by combining content areas and learner outcomes. Ahdell and Andresen (2001) described the alignment of eLearning content with learner needs. Their research was extremely relevant to developing procedures and assessment tools for aligning COTS game content with military instructional goals.

Testing

Case Studies

Barbazette (2004) provided five types of case studies based on learning objectives. Three types of case studies described were relevant to this research: (a) The practice case study was used to identify prerequisites and a sequence of multiple skills, (b) application case studies were used to apply a set of complex ideas and/or skills that appeared within the case as a relationship to elements within the case; and (c) the serial case study required that elements from the preceding other types of cases were combined to develop a progression of skills. Positive and negative characteristics were identified. A problem-solving model, which required systematic and creative problem-solving techniques by the target population, was used in each of the cases. Barbazette's (2004) work was very similar to the action research method described by Coghlan and Brannick (2001).

Implementing Quality Training Tools

In a report by Hays, Stow, Ryan-Jones (2005), a method of testing computer and web-delivered instruction for instructional quality and usability was described. Repurposing the information discovered in this document was an easy transformation, resulting in a workable testing method for developing user interface evaluation criteria, navigation and operation evaluations, and usability criteria. The testing procedures developed from this information were intended to indicate if the COTS games assessed in this study could be used to provide possible repurposed indicators for military

applications. If any of the games actually had instructional value that could be used in military training endeavors and game assessment tool was successful in indicating potential reuse, then the tool could be useful for the purpose of its design, if approved by the military. The tool developed by repurposing existing analysis tools then can become part of the overall instructional design process developed in this study. The tool developed for this study has the potential to be used in future COTS games analysis procedures.

Summary

Developing comprehensive testing procedures for assessing COTS games to support military training was the primary goal of this study. The literature review in this chapter entailed systematic and comprehensive examination of types of games, learning theories, and quality instructional assessment tools. Technical reports, online websites, articles, journals, and relevant books were included in this review. By cross-referencing material explored during the literature review, a solid test procedure for this research was able to be established.

CHAPTER 3
METHODOLOGY AND PROCEDURES

Introduction

This chapter has been organized to detail the methodology and procedures used to conduct the study. Included are descriptions of (a) the research design, (b) the case studies, (c) the role of the Naval Tactical Task List, (d) instrumentation, (e) population, and (f) procedures used for data collection and analyses.

Research Design

The method chosen for this research was an action research approach with an emphasis on case studies. Action research summarizes and applies a set of complex ideas and/or skills that appear within a relationship to elements within a case (Barbazette, 2004). This approach to the research problem provided a logical method for accomplishing the research goals.

Three games were chosen to test an assessment process created just for analyzing COTS games for military applications. The research design had to ensure that all aspects of content, appropriateness, reliability, transferability, and usability of the games were addressed. Summarizing the set of complex ideas and the skill set required for usability of the games is essential to future game use for naval applications. The design incorporated and cross-referenced different instruments that were used to evaluate the content, learner outcomes, objectives, and usability of each game and was approved by the University of Central Florida's Institutional Review Board (Appendix A) and proceeded only after the informed consent (Appendix B) of participants was obtained.

After all tools were utilized, data scores were combined and an overall report was generated describing the results of each tool used. An overall recommendation by the testers was also reported. The potential of each game was not reported because that information has no effect on if the MGAT tool was effective or non-effective. The games were only used as sample products for the purpose of evaluation of the assessment game tool.

Establishing Reliability, Credibility, and Transferability

To set the foundation for a solid testing method, establishing reliability, credibility, and transferability was essential to this study. The literature related to game theory, simulators, and instructional games was plentiful, and the literature review was extensive. Literature related to a process of assessing COTS games for military objectives could not, however, be located.

Reliability

The reliability of this study in assessing the applicability of COTS games for military application was dependent on previous research and the quality of the games chosen for the case studies. Although the games recommended for this study originated from the Naval Gaming Lab at Naval Air Warfare Center Training System Division Orlando, Florida, it was not clear if these games were appropriate for the study even though they were built with military objectives in mind. By combining and repurposing previously designed military interactive courseware assessment methods, the reliability of the proposed process built on the credibility of the established process was high.

Credibility

The credibility of research refers to how deeply and truthfully, the topics of gaming, instructional games and simulations have been considered. In total, it took almost two years of research into the topics of game theory, instructional games and simulations to develop reliable instruments of assessment to be used in the research.

During the initial phase of the research, library references, books, articles, gaming magazines, technical reports, Internet searches, and various other types of documentation were gathered and evaluated for their quality and relevance to the topic(s). Navy authorities approved and recommended previous assessment tools in the area of interactive courseware to research and repurpose in the development of assessment instruments for this research. Therefore, the foundation of the process and products produced by this work was based on established practices and was credible.

Transferability

It was hoped that the findings from this case study that were used to verify the process developed for the assessment of COTS games for military applications would be useful to military organizations and commercial companies. Since there are many similarities between gaming products, it was likely that some of the research findings would be applicable to other gaming products and assessment processes. Assessing military courses for game attributes could also be another by-product of this research and would indicate further transferability.

Case Studies

The Naval Air Orlando Training System Division gaming laboratory recommended three games for analysis as sample games for the purpose of this study: Dangerous Waters, 688(I) Hunter/Killer, and Search & Rescue 3. It was assumed that all three games were built on naval objectives and missions, but only analysis of the products could determine if those objectives were in alignment with real military objectives and would meet military training needs. The assessment process was used to determine (a) naval objective alignment, (b) content verification, (c) learner outcomes, and (d) usability for each of the three games tested.

Game A: Dangerous Waters

The Dangerous Waters game calls on the player to take control of seven of the world's most lethal naval platforms for Aircraft Helicopter, surface and submarine platforms. The objective of the game is to fight for control in one gigantic 35-mission campaign with dynamic elements and persistent player results. The multi-station mode of this game allows multiple players to work together on the same platform. The game also issues voice commands via microphone to a virtual crew. The student must follow virtual orders that provide an infinite combination of mission goals, enemy forces, and random locations.

Game B: 688(I) Hunter/Killer

"The 688(i) game is a realistic submarine simulation created to master the sonar and weapons control systems, to learn to develop real target solution, and to outfit boats

with the latest advanced weaponry. The player uses skills to complete a tour of duty and to earn dolphin insignias to become a true submariner."

Game C: Search and Rescue 3

The Search and Rescue game is based on U.S. Coast Guard missions. In this game, the US Coast Guard has put out the call for brave individuals to step forward and risk their lives in the line of duty. It is the player's job to command any of three authentic rescue choppers through over 100 new missions in an attempt to save lives. The player is required to repair a violated oil rig and pluck victims from a frigid ocean's swell. Every mission immerses the player into an authentic rescue mission.

The Use of the Naval Tactical Task List (NTTL)

While conducting the initial search for direction of the study, the Naval Tactical Task List (NTTL) was made available through naval resources. The NTTL was developed by Navy Warfare Development Command in Newport, RI. It is available at http://www.nwdc.navy.mil/Library/UNTL_NMETL/default.aspx and can be easily accessed by the public. "The NTTL was designed as an interoperability tool for naval commanders to use as a master menu of tasks, conditions, and measures that provide a common language and structure for the development of mission plans, training courses, and the assessment of tasks that can be applied at multiple levels of war, i.e., strategic, operational, and tactical operations." A detailed description of each task associated with higher-level objectives is provided in the NTTL. Each game identified for this study had an overall objective with some incorporating mission plans. In developing an assessment

criteria matrix for this study, a process was used that cross-referenced naval objectives with gaming objectives that were designed specifically for assessing instructional games in military applications.

Combining Social Impact Games, Gagne, and Blooms Taxonomy

By combining Social Impact Games, Gagne's work, and Bloom's Taxonomy with quality evaluation tools, a method of testing COTS games for military application was developed and assembled. By examining content attributes and learning styles, an effective method of associating learning objectives was able to be considered. The content taxonomy was an essential piece of the puzzle to pull all of the parts of the design for the assessment research method together.

The literature review in these areas of study, content attributes and learning styles, helped set the foundation for developing comprehensive test procedures. The test procedures for this study were directly derived from combining different information from the literature review, materials associated with social impact games, Gagne's work, and Bloom's Taxonomy. The social impact games material described content, learning outcomes, and gaming styles. This content and learning outcomes information was compared to Gagne's work and Bloom's Taxonomy. Associating the content verbs from Gagne and Bloom with the social impact games content, a matrix was developed to test the COTS games. Developing a complex assessment matrix that combined different approaches to problems was determined by the researcher to be the most appropriate technique. This permitted each game case study to be assessed for content, learning outcomes, and game style. The content of each of the COTS games was cross-referenced

with learning objectives. The learning objectives were cross-referenced with the Naval Tactical Task List learning objectives as part of the testing criteria. The NTTL was also assessed for content attributes and each objective was associated with a particular game style. The matrix, itself, was considered to be an additional, useful tool available to those working with future gaming development projects, COTS evaluations, and testing procedures.

Cross-referencing Gaming Objectives with Naval Objectives

In the researcher's opinion, the importance of cross-referencing gaming objectives with naval objectives cannot be overstated. If COTS games cannot provide instruction based on naval objectives, they are of no use to military endeavors. The purpose of each game recommended for use in military training must be assessed to ensure that the game can meet military goals and be of some instructional value in military training. Beyond their usefulness as an overall motivational tool in military training, games can be used as primary training tools. Ensuring that COTS games meet stringent military standards before being used to supplement military training goals was one of the goals of this study. Discovering if a COTS game could be repurposed to support military training was also an important goal. Developing a testing tool that could determine whether or not each analyzed COTS game met military objectives was the ultimate goal of this research. Therefore, cross-referencing gaming objectives and naval objectives was a logical step in the process.

Instrumentation

The McNeese Game Assessment Tool (MGAT) was developed by repurposing the quality evaluation tool developed for assessing web-delivered instruction developed for the Navy. This tool was only part of the design element used in developing the game assessment tool for this study. This information was used to develop two of the instruments, the Evaluation Summary Sheet and the Instructional Quality Usability Criteria Summary Sheet found in Appendix F and G. Then the matrix from the Social Impact Games (2006) website was used in providing the foundation for developing the other instruments using objectives as the common element in the cross reference tool. This web site associated types of learning with content, learning activities, and possible game design. Instructional design methods use content and learning activities in every course developed for the military. The content described within the Social Impact Games (2006) website correlated with Bloom's Taxonomy competence levels and Gagne's work. The one element that put a unique twist to the design of the MGAT was that the Social Impact Matrix that also correlated content to possible game styles. By combining all of these elements the last three instruments were developed. MGAT is comprised of five different instruments. The Cross Reference Game and Learner Outcome Matrix (Appendix C) was used in reviewing different games to see if they provided clear cut objectives based on relevant content. This tool was used to provide information to the Content Assessment Matrix (Appendix D). The Content Assessment Matrix was used to determine if the game analyzed related to specific instructional content attributes. The NTTL and Game Objective Correlation Matrix (Appendix E) was used to determine if the games related to any established naval designed training objectives. The Instructional

Quality and Usability Criteria Matrix (Appendix F) served to record the assessment of each game for maximizing effectiveness, efficiency, and satisfaction. The Instructional Gaming Features Evaluation Summary sheet (Appendix G) provided repurpose indicators for each game. After all tools are utilized data scores are combined and an overall report by a qualified instructional system designer will be given describing the results of each tool used. Then the instructional designer provides recommendations based on the scores to utilize, repurpose, or discard the game for military training.

Cross-reference Game and Learner Outcome Matrix

The Cross-reference Game and Learner Outcome Matrix designed for use in this study to cross-reference gaming objectives with learner outcomes, content, and game style is displayed in Appendix C. This matrix supported the analysis of different games to determine if they depicted clear cut objectives based on relevant content. The objectives provided insight into expected learner outcomes. Game style referred to game design and whether the game was goal oriented or competitive. Goal orientation was also a very important attribute to identify because it could assist in the assessment of repurpose efforts if needed.

Content Assessment Matrix

The Content Criteria Instrument was used to assess the extent to which each game incorporated selected content such as facts and skills. The content criteria were based on Bloom's Taxonomy. The matrix permitted participants to identify content, learning activities, game style, learner outcomes. Links to Gagne's learning conditions and

Bloom's taxonomy were also identified. Appendix D contains a sample Content Assessment Matrix.

Naval Tactical Task List (NTTL) and Game Objective Correlation Matrix

Appendix E provides an example of the matrix that was used to determine if any of a game's objectives met any of NTTL's objectives. The information in the Cross-reference Game and Learner Outcome Matrix was cross referenced with the Naval Tactical Task List (NTTL) to arrive at the Naval Tactical Task List (NTTL) and Game Objective Correlation Matrix (Appendix E). The correlation process was used to determine if the game could meet particular naval objectives.

Instructional Quality and Usability Criteria Matrix

Usability is an integral part of software development and has been so for the past 20 years. No one wants to play games that are frustrating or difficult to master. Usability is about maximizing effectiveness, efficiency, and satisfaction, and there are many reasons why usability is important in computer-based games. "The user experience is very sensitive to usability problems. Even the smallest glitch in a user interface may render an otherwise good game into a rather annoying experience" (Laitinen, 2005). Usability is also important for the future of military gaming endeavors. As gaming continues to increase in popularity, the ease of setting up games and repurposing games is the foundation for future gaming research. The usability criteria provided in Appendix F were used to determine the usability of each game. The usability matrix was built by

repurposing the quality evaluation tool developed by the Navy that assesses computer and web-delivered instruction to provide a creditable analyze tool.

Instructional Gaming Features Evaluation Summary Sheet

The Quality Evaluation Tool presented as part of a Computer and Web-Delivered Instruction Technical Report was used to develop the instructional attribute criteria. A Quality Evaluation Tool was developed by the Naval Air War Warfare Center Training Systems Division Orlando, Florida in June 2005. It is this tool, described in the Quality Evaluation Tool for Computer and Web-Delivered Instruction Technical Report that was restructured and repurposed for instructional gaming criteria. Instructional gaming features evaluated included instructional content, instructional activities, performance assessment, and performance feedback. An example of this refined tool is provided in Appendix G.

In the process of analyzing games for military instructional purposes, it is important to emulate previous established military standards used for evaluating similar instructional products such as interactive courseware. It is also important that instructional products meet their instructional goals which can be measured by predetermined instructional quality evaluation criteria. Therefore, the instructional quality measure that was used in the evaluation process was quality as "fitness for purpose." When an instructional product does the job for which it is designed, (e.g., it meets its instructional objectives), it can be said to be of high quality (Hays, Stout, & Jones, 2005). Instructional features include content, activities, assessments and feedback.

Population

Students from the Human Performance Graduate Program at the University were used to test the McNeese Game Assessment Tool in a usability study. This particular student population was chosen because of their association in the studies of human computer integration, games, simulation, and usability studies within their graduate work. Generally twenty students on an average are enrolled per semester at the University. However, this semester only ten students were enrolled and only four participated in testing procedures. It was important to have students who understand games and usability studies to promote reliable results. Due to the small population of the low enrollment of the Human Computer Integration course, response to the study was considerable lower than expected. However, the quality of the response content for the study was better than expected. Participates were not coerced in any way and all participation was voluntary

Procedures used in Data Collection

All of the participants of the study were meet in an official introduction meeting. Each student was given an Informed Consent form to read and sign as referenced in Appendix (B). Each student was also given a copy of the MGAT on a CD that had a complete set of electronic instructions. The disc also had all of the instruments needed for the assessment and a student questionnaire document. The games that were used for the assessment of the MGAT were installed into the assigned lab space used by the Human Performance program students. The students were asked to complete the testing and answer the student questionnaire within a three week time table. The students were asked to evaluate the MGAT on usability using the three games provided. The students were

asked if the assessment tool was effective analyzing game products. They were to provide a yes or no answer. Next each student was asked if each instrument meet their purpose of design. Once again the students were asked to provide a yes or no answer. Then they were asked to evaluate each instrument individually concerning improvement information. They were asked if the instrument needed improvement, how much improvement very little, moderate, no improvement, or did the instrument need to be discarded. Then they were asked to provide comments on how they would improve the instrument. The instructions to the testing procedures are in Appendix (H). Results were sent electronically to the primary investigator for analysis. The results for sample games used in this study were not reported. The overall outcome indicators for if a game possessed repurpose potential has no relevance to the effectiveness of the MGAT tool outcome. The primary purpose of the study was to assess the MGAT tool and the process involved for the assessment of COTS games.

Analysis of the Data

After the usability study was conducted results were collected and analyzed. Each student delivered the results electronically and the results are reflected in the results section of this study. If the tool proves to be effective the product will be recommend for use to naval officials. If the tool should prove non-effective or needs improvement, further studies and development in this area will be indicated.

Analysis

The analysis tool consists of five instruments; each instrument provides a different purpose in the assessment of games for reusability. Each tester used the MGAT instrument in the assessment of each game and then completed the usability student questionnaire. Once the testing was complete the data was collected and analyzed. Although each instrument was important, it was the overall usability of the product that was the most important issue to understand. A complete review of the all of the student recommendation information was also needed before a conclusive analysis could be reported. The information was combined to form a comprehensive view of the data. Each instrument was looked at. The Cross Reference Game and Learner Outcome Matrix looks at different games to see if they provide clear cut objectives based on relevant content. This tool was used first in providing information to the Content Assessment tool that provided basic information to other instruments. The NTTL and Game Objective Correlation Matrix was used pertaining to the games that related to any established naval designed training objectives. This analysis was important because if successful then any objective could be used within the correlation matrix. Special attention was paid to this instrument in reporting future potential and repurpose for the assessment tool. If this instrument was effective in design it could be used not only for correlation to naval objectives but to other instructional course objectives as well. The content assessment determined if the game analyzed relates to specific instructional content attributes. Since this particular instrument cross referenced game styles it was important to analyze how effective the instrument was and special attention was paid to any recommendation by the student population. The Instructional Quality and Usability tool assessed each game for

maximizing effectiveness, efficiency, and satisfaction. Data was collected and special attention was paid to any recommendation by the student population. The Instructional Game Features tool provided repurpose indicators for the use of each game. Data was collected and special attention was paid to any recommendation by the student population. After all tools were utilized data scores were combined and an overall report was described in the findings section of this study describing the results of each tool used. Then an overall recommendation by the students was reported, after all data was collected and analyzed for results.

Summary

The results of this study depended on the overall usability, reliability, and credibility of the assessment tool developed in this study. If the tool was found effective then it could be used as an indicator to ensure that all aspects of content, appropriateness, reliability, transferability, and usability of the games are addressed. Summarizing the set of complex ideas and the skill set required for usability of games is essential to future game design and use for naval applications. The method determined the outcome for this study and the design determined the effectiveness of the tool developed. Each instrument was analyzed for effectiveness and improvement recommendations.

CHAPTER 4
RESULTS

Screening Process

This study combined different assessment methods for the evaluation of three different games. This approach provided a unique study that focuses on usability information that supports the utilization and repurposing of commercial-off-the-shelf (COTS) games for military training. A testing lab was utilized at the University of Central Florida.

The research design had to ensure that all aspects of content, appropriateness, reliability, transferability, and usability of the games were addressed.

Table 1

Design Element Table

Design Elements	Definition
Content	Specific topics or material provided as written information that reflects the purpose of a game product for the purpose of assessment.
Appropriateness	Appropriateness refers to the overall suitability of a game for possible use in military training.
Reliability	Reliability refers to the information used to create the research design is from established reference sources. The quality of the research design is based on previous published research and the instruments used can provide successful results in the assessment of games. The reliability of a game depends on the successful

	transferability and quality of reusable information within a game.
Transferability	Transferability refers to the information that can be easily reused with new product designs.
Usability	Usability refers to how much of a game product can be used in the creation of instructional products for military training.

The student questionnaire asked the students to summarize the overall usability of the assessment tool after they reviewed the games. The tool summarizes a set of complex ideas and the skill set required for evaluating and assessing games for reusability in reference to military training. The design incorporated survey questions that addressed and cross-referenced different instruments that evaluated the content, learner outcomes, objectives, and usability of MGAT for each game. Five different instruments were created by the primary investigator for this task of game assessment:

Table 2

MGAT Instrument Matrix

MGAT Instruments	Name	Purpose
Instrument 1 (Appendix G)	Evaluation Summary Sheet	The purpose of this instrument is to assess games for “fitness of purpose”.
Instrument 2 (Appendix F)	Instructional Quality Usability Criteria Summary Sheet	The purpose of this instrument is to assess games for their effectiveness, efficiency, and satisfaction.
Instrument 3	Content Assessment	The purpose of this instrument to assess

(Appendix D)	Matrix	the extent to which each game incorporates selected content such as facts and skills.
Instrument 4 (Appendix C)	Cross-Reference Game and Learner Outcome Matrix	The purpose of this instrument is to cross-reference gaming objectives to learner outcomes, content and game style by assessing learner outcome.
Instrument 5 (Appendix E)	NTTL's Objective Dross Reference Matrix	The purpose of this instrument is to compare game objectives to military objectives based on content.

After the tool was utilized in the assessment of each sample game provided for the purpose of this research, data scores were combined and an overall report was given describing the results of the usability of the MGAT tool. Finally the participants provided recommended improvements to the assessment tool. The students from the Human Performance graduate program were provided an opportunity to test the MGAT tool. A total of approximately 20 participants were anticipated; however, only 10 took part in the actual study, and only 4 reported results. The amount of time recommended for each student to test the software was roughly two hours for each game they reviewed.

The 3 sample games chosen for the study were thought to take approximately 6 hours per student in each of 3 sessions for a total time of 18 hours of student involvement in the analysis process. Tasks included reviewing different games using the McNeese Gaming Assessment Tool, answering a questionnaire on how well the tool worked or did

not work, and providing recommendations for improvements. The participants were expected to come to the lab 3 times for a total of 120 minutes during the span of two weeks.

Participants met in an official introduction meeting, and each student signed the Informed Consent form and promised to provide results within a two-week deadline. Each student was given a copy of the M-GAT on a CD with a complete set of electronic instructions. After two weeks, there were no results, so another meeting was arranged to determine where the students were in the process. The students reported that they tried loading the games on their own laptops for review. The install proved difficult for the Apple users who said they had no results to report. The students also reported that due to graduate course load, it was difficult to find time to perform the study. An offer was made to provide financial reward for the analysis or provide intern information for the Naval Warfare Center Training System Division. It was stressed that due to University time lines that the analysis needed to be done quickly. At the end of the third week the first student returned results electronically. An email message was sent to the group asking to report back on the questions within the student questionnaire, using only one game if that could provide results; three more responses were obtained by the end of the fourth week. Participants reported several reasons for their low response rate, including a longer than anticipated testing time, and course work deadlines which interfered with their involvement in the study. This information needs to be taken into consideration when using graduate students in future research.

Special attention was paid to individual recommendations that were provided electronically. It was stressed that student participation did not affect grade or status in

the graduate program. Individuals had the right to withdraw consent at any time without consequence. Participants did not have to answer any question that they did not wish to answer when completing the survey, interview or questionnaire research. The research design lacked appropriate incentives to persuade the participants to produce results that could have provided a greater return on useable data from the student population information. The analysis was in an aggregate form and even though there were individual answers, names were not revealed.

No records were kept that identified student participants. Identities of all students who participated in the study were protected and remained confidential. Those who participated were only known to the principal investigator and lab administrator. The participants were given consent forms by Dr. Mouloua prepared by Patricia McNeese. After signature, they were to be kept in a safety deposit box owned by Patricia McNeese, for a minimum of 3 years and separated from other study documents. After all of the data were collected, analyzed, and published all electronic reports were destroyed. All names were to be kept confidential in reference to this study.

Findings

Each graduate student evaluated three sample games chosen for this particular study provided by the Naval Air Warfare Center Training System Division (NAWCTSD), Orlando Florida. The three games utilized were Game A: Dangerous Waters, Game B: 688 (I) Hunter/Killer, and Game C: Search and Rescue 3. These games were previously described in Chapter 3. Using the five different instruments developed as an assessment tool, each student used the tool to collect repurpose information for the

sample games on computers and laptops used within the assigned UCF lab. The data collection took under a month to complete. Potential benefits to participants included a greater understanding of the aspects of content, appropriateness, reliability, transferability, and usability of games in relationship to human performance. The study also gave the students an exercise in performing a usability study that is part of their assigned curriculum for the Human Computer Integration Program. During the usability study each student could evaluate individual sample games in relationship to design and overall performance based features using logical questions developed within MGAT. For the students who participated, this study provided insight into different game designs in regards to human performance.

Research at the University of Central Florida was conducted under the oversight of the UCF Institutional Review Board. Questions or concerns about research participants' rights were directed to the UCF IRB office, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246.

Interpretation of Data

After all the obtained data were analyzed, it was determined that all students' responses obtained from the student questionnaire document were identical in the evaluation of the MGAT pertaining to the questions concerning the effectiveness of the product in analyzing game problems and the purpose of design. What is meant by effectiveness is can the process designed within this study actually assess COTS games

for the purpose of reuse in military products. The recommendations by the student population in regard to instrument improvements differed somewhat. Ten students were provided questionnaire and the MGAT product, return rate = 40% and N=4.

Table 3
Item 1: Was the Assessment Tool Effective in Analyzing Game Products? (N = 4)

Response category	n	%
Yes	4	40
No	0	0
Summarized Student Recommendations	• A programmable algorithm should be incorporated into the tool so that an automated search could be done to cross reference game objectives to training objectives.	
	• Clearer instructions are needed when reviewing these instruments, students thought that if a reviewer checked the content associated with the game that the appropriate learning activities.	
	• Possible game styles should automatically be transferred into the information for the NTTL and Game Objective Cross matrix.	
	• If game objectives correlated with another objective within the database that automation would speed up the analysis process.	

	• Automating the process would simplify the work and add efficacy to the tool, especially for the objective database.

Table 4
Item 2: Did Each Instrument Meet the Purpose of Design? (N = 4)

Response category	N	%
Yes	4	100
No	0	0

Table 4
Item 3: Did the analysis tool need improvement, if so, how much? (N = 4)

Instrument	n	%	Level of Improvement Needed
Instrument-1	4	100	No Improvement Needed
	0	0	Very Little Improvement
	0	0	Moderate Improvement
	0	0	Discard Instrument
Instrument-2	4	40	No Improvement Needed
	0	0	Very Little Improvement
	0	0	Moderate Improvement
	0	0	Discard Instrument
Instrument-3	0	0	No Improvement Needed
	0	0	Very Little Improvement
	4	100	Moderate Improvement
	0	0	Discard Instrument
Instrument-4	0	0	No Improvement Needed
	0	0	Very Little Improvement
	4	100	Moderate Improvement
	0	0	Discard Instrument
Instrument-5	0	0	No Improvement Needed
	0	0	Very Little Improvement
	4	100	Moderate Improvement
	0	0	Discard Instrument

Table 5

Student Response Instrument 1

Student Response					Answer
Student 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 3	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 4	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed

Table 6

Student Response Instrument 2

Student Response					Answer
Student 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 3	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 4	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed

Table 7

Student Response Instrument 3

Student Response					Answer
Student 1	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student 2	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement

Table 8

Student Response Instrument 4

Student Response					Answer
Student 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Student 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement

Table 9

Student Response Instrument 5

Student Response					Answer
Instrument 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement

Table 10

Student Response Comments and Recommendations

Student Response Recommendations	Comments
Student 1	The main issue I have is that I do not know what to put in the boxes for assessments 4 and 5. (Cross-Reference Game and Learner Outcome Matrix and NTTL's Objective Cross Reference Matrix). Am I putting a rating? A checkbox? Furthermore, I do not understand the scaling (if any) for "Learner Outcomes", "Content", and "Game Style". If we're rating good/bad or present/not present, what constitutes bad game style or missing game style? Suggest that clearer instructions are needed when reviewing these instruments. I also believe that if you checked the content associated with the game that the appropriate learning activities and possible game styles should automatically be transferred into the information for the NTTL and Game Objective Cross Reference Matrix.
Student 2	Search and Rescue 3 does not appear to be compatible with Windows Vista. I can run it but when I try to fly, the screen goes crazy. I recognize that we may be able to get all of this working in the lab, but there is too little time to do a complete analysis. I think that if you correlated game objectives with objectives using an automated database it would speed up the analysis process. Automating the tool to simplify the work would add efficacy to the tool. I could not use the games in Apple, so I had to use the lab computers, which are Vista.
Student 3	Coordinating to transfer the physical boxes of the games has proven more time-consuming than anticipated. We were trying to pass the games along, but coordinating a time when all of are available takes nearly a day itself. So these games have not been going around that fast. I might be the 3rd or so person to have them. Plus, you need the CD's to run the game, so only one person can work on this study at a time.
Student 4	Suggest putting a programmable algorithm into the tool so that an automated search could be done to cross-reference game objectives to training objectives.

Student Recommendations

Generally when statically reporting small sample sizes, the nonparametric test are indicated; however, because the sample size was so small, descriptive tables were provided for this study. The results indicate that more testing is needed in the analysis of this tool using a larger sample size and that no conclusions to the success of this tool can be reported at this time.

However, according to the study survey and the results of the data collection reported in this study have indicated the application of the McNeese Game Assessment Tool (M-GAT), although currently in a beta stage, does have potential for future game assessment. The overall assessment indicated that the tool was effective in analyzing game products and that the instrument did meet the purpose of the design.

Each instrument within the tool was also analyzed for potential assessment usage. Instrument 1, the Instructional Gaming Features Evaluation Summary Sheet (Appendix G), was used to assess games for fitness of purpose. The students reported that no improvement was needed for this particular instrument. The students also indicated that Instrument 2, the Instructional Quality Usability Criteria Summary Sheet (Appendix F) did not need improvement. The Instructional Quality Usability Criteria Summary Sheet assesses each game on the effectiveness, efficiency, and satisfaction of a game.

The students however reported that Instruments 3, 4, and 5 all needed moderate improvement. Instrument 3, the Content Criteria Instrument (Appendix D) was used to assess each game to determine if the game incorporated any of the following attributes for content, such as facts or skills. Instrument 4, Cross References Game and Learner Outcome matrix (Appendix C), looks at different games to see if they provide clear cut

objectives based on relevant content. Instrument 5, is the Naval Tactical Task List matrix (Appendix E), that cross references games and learner outcome matrix looks at different games to see if they provide clear cut objectives based on relevant content.

Part of the study was to have the students recommend improvements to the MGAT. The students described the Cross Reference Matrix Game and Learner Outcome Matrix and the NTTL's Objective Cross Reference Matrix as confusing on what to put into the checkboxes. More work is indicated in this area of the MGAT tool.

After reviewing all of the student recommendations, automation of the tool was the common recommendation of the usability study participant group. They all agreed that the current paper-based MGAT tool could use a database programmer's touch to make the tool more efficient.

CHAPTER 5
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study, although small in nature, contributed significantly to the study of game and simulation integration assessment products. The literature review indicated very little scholarly work has been conducted in this particular area of study, game assessment research. The integration of games and simulators is on the forefront military training. However, there has been no evidence that COTS games relate appropriately to instructional objectives or that they can train students to perform effectively in the field. While repurposing games is a solution to saving the government instructional development dollars, a solid process of assessment has not been developed. Warren, Diller, Leung, Ferguson, and Sutton (2005), described "a problem in not having access to the underlying source code which often made it difficult to add new features to games identified as needing repurposing to meet military goals." This study was initiated in order to establish a process of evaluating games for repurpose attributes. The assessment process was evolved in order to save the government money in instructional game design for dealing with different issues pertaining to development costs.

While conducting the literature review for this work, it was interesting to discover that research of this kind, which combines different assessment methods to assess games for military application, had not been previously reported, despite the military's use of games. A major part of the design for an assessment process was built on Hays (2005) effectiveness of instructional games literature review. Hays' report was instrumental in establishing the foundation for this research and providing essential formats for the

instruments used in this study. Hays' previous work provided the first steps in developing a comprehensive procedure for this study. He described current research in game attributes, game literature, game style, and how some of the game attributes can be used in instructional games. However, there is not an actual method in cross-referencing and analysis of objectives for repurposing games in reference to military training. While researching different assessment methods, an epiphany emerged to combine instructional design assessment methods and game information. The Serious Game website added an extraordinary vision to the mix. The work on the web correlated game style, Bloom's Taxonomy, and Gagne's work. Bloom's (1956) Taxonomy provides verbs used in the design objectives; those verbs were correlated to Gagne's work the Learning Conditions using content as a common ground. The verbs provided in Bloom's work also associated learner outcomes with objectives and game styles within the Social Impact Games (2006) website. Bloom's Taxonomy has served as a foundation for building instructional objectives and Gagne has been viewed as the father of military training and the foundation for instructional design methods for military training Sage (2005). All of the primary investigators training in instructional design methods led her to believe that this was an extraordinary set of circumstances. The vision was clear as how to proceed in creating a usable instrument for military purposes. Combining the information into a usable form of assessment seemed like the next natural step in the process. Thus, the McNeese Game Assessment Tool (MGAT) was developed for the purpose of assessing COTS games for military endeavors.

The Theory

The primary purpose of conducting this research was to establish guidelines and characteristics for integrating elected aspects of games into ongoing instructional approaches. The theory was that if you could assess military courses using Hays & Singer (1989) tools based on military objectives that were written using Bloom's and Gagne's work, then you could cross reference those attributes to COTS games and assess the games for repurpose attributes using different assessment methods within one process. U.S. Department of Defense, (2000) The Naval Tactical Task List (NTTL) matrix seemed like a great place to start to build the objective database because those military objectives were already defined. It was a simple process of designing an instrument that incorporated game correlation to suggested game style based on content and learner outcomes using the NTTL as a base. It occurred to me that if the game objective possessed a certain content attribute base on game style and if the over all objective correlated to a military object, then that game could be used in creating an instructional game to support the military object. If the game correlated to the objective, then so would the content, learning activities, game style and learner outcomes. The repurpose indictors however were a little bit more complicated in the design. By creating the tool to work together in a step-by-step process, then the higher the assessment scores, then the more likely the game could be repurposed. If the product provided high scores with no 1's or 2's in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and provided clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game could be recommended major rework and repurpose to support naval training purposes. If the

product provided low scores in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and no clear cut objectives could be identified within the Naval Tactical Task List Objective Matrix, then the game could not be recommended for use to support naval training purposes. If the product provides high scores with no 1's or 2's in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and provides clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game can be recommended major rework and repurpose to support naval training purposes. If the product provides low scores in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and no clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game can not be recommended for use to support naval training purposes. As a result of the theory the MGAT was produced and created for the specific purpose of the assessment of games for this usability study.

Although currently in a beta stage, the tool was found to have potential for future game assessment by the participants of this study. This product also was determined to have potential for a reverse engineering process in assessing military courses for appropriate game attributes. If you replace a game objective with a military course objective, then you could use the Content Assessment Matrix (Appendix D) in cross-referencing content to suggested game styles. This information also has a huge potential in the commercial world for game developers to assess their products for conversion to instructional games based on objectives, so that their products could be marketable in a military training arena.

Conclusions

The overall results by the participants of this study indicated that the tool was effective in analyzing game products and that the five instruments that make up the tool did meet the purpose of the design. However, the study indicated that the current instruments needed recommended modifications and further testing with a larger population group before the tool could be utilized. The recommended modification to the product requires a dedicated advanced programmer to develop the database algorithm and will require funding. The assessment process identified in this study provides a step forward in the area of game and simulation integration research.

This study provided positive results and a foundation to move forward with game assessment research. The student recommendations have help to play a vital roll in the direction of the next phase to further development of the MGAT product. The results of this study, as reported by the student usability testing group, indicated a potentially useful process within the MGAT for military endeavors and commercial game developers. However, automating the product seems to be the most logical step in the development. Due to the small sample size, however, more testing research was indicated within a larger testing lab to provide a larger reliability sample size. Since this product was designed to be used by instructional designers, a change in the chosen population, using instructional designers that have previously worked with instructional games was also indicated. Much research remains to be done in this area of the assessment of game in instructional design to enhance instructional integration goals for future game, simulation and training applications.

In regard to future research, special attention should be paid to the chosen research population. While graduate students may have the expertise to perform a usability study, their time schedules may not allow for such an endeavor. Potential participants should be given plenty of lead time to prepare, at least four to five months is recommended for the time needed for this type of study. Motivational devices may be necessary to persuade the testing population to finish the study. If the target population is not well aware of the time demands, the result could well be a low sample size, similar to this study's.

Instructional games and simulation products will continue to emerge in military environments, and the use of assessment products will be a critical part of keeping development costs as low as possible, especially in a time of economical recession. The results of those assessments could provide major structural changes in developmental processes and instructional training game delivery systems.

Recommendations

It is recommended that the paper based game assessment tool be automated so that a search engine can be established when comparing game objectives to training objectives. The automation process could also duplicate information in similar content, learning activities, and possible game styles analysis boxes. It is also recommended that a larger military testing lab would provide a larger, reliable sample size, with sample games already installed into the lab. It is suggested that the testing population should consist of instructional designers rather than human computer integration students. The primary user of this tool is the instructional designers, their

input and recommendation concerning the MGAT could provide a whole new direction in the development of this tool. This testing strategy is recommended in order to enhance the MGAT so that it could assess COTS games and provide a software application that automatically calculates information. When the theory of this analysis process was developed, it was always thought that automating the MGAT would be the next logical step. If a chosen game objective correlates with a military objective, then all of the attributes such as; the content reference, learning activities, game style, learner outcomes should correlated with the Gagne's Learning Conditions and Bloom's Taxonomy associated with the military object. That information could be atomically transferred into the appropriate correlating boxes. This would save the reviewer from hand writing this information into the boxes, thus reducing confusion by the participant. It is further recommended that the product has an objective database. The database should be designed to capture game objectives as well as military course objectives, there for instructional games could also be analyzed for potential reuse. With continuous development of the database, the probability of finding a compatible objective is more likely.

This process of assessment was designed to be used by instructional designers as a future tool in assessing games and to provide repurpose indicators to lower development costs when integrating game and simulator applications. As the military continues to look for ways to reduce cost, having a reliable assessment tool that is focused on repurposing existing products will play a vital roll in future military course development. The next step in the development phase is to improve the current product and processes. It would also be advantageous to "reverse engine" the product to assess

military training courses for possible game attributes, therefore the military courses could be used as instructional games in the next phase of courseware development so that we can keep our young recruits occupied with training that engages them mentally. The next step testing phase cannot be accomplished until the software programming algorithms for comparing objectives is completed. This step will also require a dedicated lab and engineering software programmers to accomplish future goals. The assessment process has potential for future research studies in the educational field, but it is essential that the assessment research in this study be taken to the next level of development. The MGAT could provide the military a way of repurposing commercial-off-the-shelf (COTS) games and keep down instructional training dollars so that military troops can benefit from cost savings while utilizing games as a training tool. The Naval Air Warfare Center Training System has already taken an interest in the project. Based on the recommendations provided in this study, they have expressed a willingness to provide funding to complete the automation of the MGAT, provide instructional designers as a testing population, and patent the process for future use, based on the recommendation provided in this study.

APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Initial Review and Approval

From : **UCF Institutional Review Board**
FWA00000351, Exp. 10/8/11, IRB00001138

To : **Patricia McNeese**

Date : **December 12, 2008**

IRB Number: SBE-08-05882

Study Title: **GAME ASSESSMENT GUIDELINES FOR MILTARY APPLICATION AND COMMERCIAL INTEGRATION**

Dear Researcher:

Your research protocol noted above was approved by **expedited** review by the UCF IRB Chair on 12/12/2008. **The expiration date** is 12/11/2009. Your study was determined to be minimal risk for human subjects and expeditable per federal regulations, 45 CFR 46.110. The category for which this study qualifies as expeditable research is as follows:

> 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.

The IRB has approved a **consent procedure which requires participants to sign consent forms.** Use of the approved, stamped consent document(s) is required. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

All data, which may include signed consent form documents, must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. 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.

To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Advise the IRB if you receive a subpoena for the release of this information, or if a breach of confidentiality occurs. Also report any unanticipated problems or serious adverse events (within 5 working days). Do not make changes to the protocol methodology or consent form before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at http://iris.research.ucf.edu .

Failure to provide a continuing review report could lead to study suspension, a loss of funding and/or publication possibilities, or reporting of noncompliance to sponsors or funding agencies. The IRB maintains the authority under 45 CFR 46.110(e) to observe or have a third party observe the consent process and the research.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 12/12/2008 02:34:33 PM EST

Joanne Muratori

IRB Coordinator

APPENDIX B
INFORMED CONSENT

GAME ASSESSMENT GUIDELINES FOR MILTARY APPLICATION AND COMMERCIAL INTEGRATION

Principal Investigator: Patricia L. McNeese, Doctoral Student Department of Educational Studies

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Lab Administrator: Mouloua, Mustapha Ph.D. College of Sciences Department of Psychology, Office: Phillips Hall 302M

Phone: 407-823-2910

Faculty Advisor: Dave Boote, Ph.D.

Associate Professor of Curriculum Studies Coordinator, Curriculum & Instruction Programs - Ed.D., Ed.S., M.Ed., M.A.

Department of Educational Studies

University of Central Florida

Office: ED 223H

Office hours: Monday and Thursday, 3:00 to 5:30

Phone: 407-823-4160

Patricia Lynn McNeese is requesting student participation in evaluating a gaming assessment tool used to establish guidelines and characteristics for integrating elected aspects of games into ongoing instructional approaches. **You must be eighteen years of age or older to participate.**

This study combines different assessment methods for the evaluation of games. This approach will provide a unique study that will be focused on information that will

support the utilization and repurposing of commercial-off-the-self (COTS) games for military training.

Each graduate student will evaluate the three games chosen for this study provided by the Naval Air Warfare Center Training System Division (NAWCTSD), Orlando Florida. Using the five different instruments developed as an assessment tool, each student will use the tool to collect data within the UCF lab. The data collection should not take over one month to complete. The results of the data collection will then be reviewed.

Patricia McNeese will collect the data and administer surveys. Dr. Mouloua will provide the testing lab and recommend students from the Human Performance graduate program to test the tool. The precise number of students that will test the product will depend on the number of students who enrolled at the time of testing and who are willing to participate in the experiment, per recommendation by Dr. Mouloua.

The research design had to ensure that all aspects of content, appropriateness, reliability, transferability, and usability of the games were addressed. Summarizing the set of complex ideas and the skill set required for usability of the games is essential to future game use for naval applications. The design incorporated survey questions that address and cross-referenced different instruments that evaluated the content, learner outcomes, objectives, and usability of each game. Five different instruments were created for this task: The Cross-Reference Game and Learner Outcome Matrix, the NTTL and Game Objective Correlation Matrix, the Content Assessment Matrix, the Quality Usability Criteria Matrix, and the Instructional Gaming Features Evaluation Summary Sheet, which are all incorporated into the McNeese Game Assessment Tool (MGAT).

After the tool is utilized data scores will be combined and an overall report will be given describing the results of the tool used. Then an overall recommendation by the testers will be reported concerning the use of the MGAT, this report can be given in person to the investigator.

Dr. Mouloua will offer the students extra credit for participation. An Alternate assignment of comparable time and effort will be made available to students who which to earn extra credit, but who do not wish to participate in the research. Participation or non-participation will not affect the participant's grade or status in the graduate program. The participant has the right to withdraw consent at any time without consequence. The participant does not have to answer any question that he/she does not wish to answer when doing survey, interview or questionnaire research. The analysis will be in aggregate form and individual answers will not be published.

Students from the Human Performance graduate program will be provided an opportunity to test the tool. We anticipate approximately 20 participates, but the precise number of students that will test the product will depend on the number of students who enrolled at the time of testing and who are willing to participate in the experiment. The amount of time recommended for each student to test the software will approximately two hours for each game they review. There are three games chosen for the study, so approximately a total of six hours and three sessions for total time involvement. Tasks include reviewing different games using the McNeese Gaming Assessment Tool, answering a questionnaire on how well the tool worked or did not work, and

providing recommendations for improvements. The participant will be expected to come to the lab 3 times for 120 minutes during the span of one month.

Potential benefits to participants include a greater understanding of the aspects of content, appropriateness, reliability, transferability, and usability of the games in relationship to human performance.

No records will be kept that will identify student participants and your identity will be protected and confidential. Those who participate will only be known to the principal investigator and lab administrator.

Research at the University of Central Florida is conducted under the oversight of the UCF Institutional Review Board. Questions or concerns about research participants' rights may be directed to the UCF IRB office, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone number is 407-823-2901."

Participant Name _____ Date: _____

APPENDIX C
CROSS-REFERENCE GAME AND LEARNER OUTCOME MATRIX

McNeese Game Assessment Tool

Cross-Reference Game and Learner Outcome Matrix

Note: All Objectives are written verbatim in order to provide a reliable cross-reference analysis.

Game	Objective	Learner Outcomes	Content	Game Style
Dangerous Waters	Take control of seven of the world's most lethal naval platforms for Aircraft Helicopter, and submarine platforms. Fight for control in one gigantic 35-mission campaign with dynamic elements and persistent player results. Multi-station mode allows multiple players to work together on the Same platform. Issues voice commands via microphone to a virtual crew. Crew will follow virtual orders. Provides and infinite combination of mission goals, enemy forces and random locations.			
688(i) Hunter/Killer	The 688(i) game is a realistic submarine simulation created to master the sonar and weapons control systems, to learn to develop real target solutions and outfit one's boat with the latest advanced weaponry. The player uses skills to complete the tour of duty and earn dolphins insignias to become a true submariner.			
Search and Rescue 3	The Search and Rescue game is based on U.S. Cost Guard missions. In the game, the US Cost Guard has put out the call for brave individuals to step forward and risk their lives in the line of duty. It is the player's job to command any of three authentic rescue choppers through over 100 new missions in an attempt to save lives. The player will repair violated oil rigs and pluck victims for frigid oceans swells; every mission will immerse the player into authentic rescue situations.			

APPENDIX D
CONTENT ASSESSMENT MATRIX

McNeese Game Assessment Tool

Content Assessment Matrix

Game 2 688(I) Hunter/Killer	Content	Learning Activities	Game Style	Learner Outcomes	Gagne's Learning Conditions & Blooms Taxonomy
Circle YES or NO	**Facts**	Questions Memorization Association Drill	Game Show Competitions Flashcard type games mnemonics action sports games	Verbal information	Facts, names, labels, location drill
Circle YES or NO	**Skills**	Imitation Feedback Coaching Continuous practice Increasing challenge	Persistent State Role Play Adventure Detective	Discriminations Motor skills	Highlight Distinctive features (fidelity), Verbal cues (coaching for multiple concepts,) Reinforcement of correct responses. Provide classification practice. Practice with informative feedback Demonstration or verbal instructions with pictures Fading or feedback

Game 2 688(I) Hunter/Killer	Content	Learning Activities	Game Style	Learner Outcomes	Gagne's Learning Conditions & Blooms Taxonomy
Circle YES or NO	**Judgment**	Reviewing cases Asking questions Making choices Practice Feedback Coaching	Role Play Detective Multiplayer interaction Adventure Strategy	Discriminations Concrete concepts	Highlight Distinctive features (fidelity) Verbal cues (coaching for multiple concepts Reinforcement of correct responses Provide classification practice Specific examples and Non-examples Graphic organizers for related and multiple concepts
Circle YES or NO	**Behaviors**	Imitation Feedback Coaching Practice	Role Play Games	Discriminations Cognitive strategies	Highlight Distinctive features (fidelity) Verbal cues (coaching for multiple concepts) Reinforcement of correct responses Verbal description of strategy Demonstrate or strategize Practice with informative feedback Robust example set that supports discovery
Circle YES or NO	**Theories**	Logic Experimentation Questioning	Open ended simulation Construction Reality Testing	Cognitive strategies	Verbal description of strategy Demonstrate or strategize Practice with informative feedback

Game 2 688(I) Hunter/Killer	Content	Learning Activities	Game Style	Learner Outcomes	Gagne's Learning Conditions & Blooms Taxonomy
					Free practice supported by verbal coaching.
Circle YES or NO	**Observation**	Observing Feedback	Concentration Adventure	Cognitive strategies	Verbal description of strategy Demonstrate or strategy Practice with informative feedback Robust example set that supports discovery
Circle YES or NO	**Communication**	Imitation Practice	Role playing Reflex	Cognitive strategies Problem solving	Verbal description of strategy Demonstrate or strategy Practice with informative feedback Robust example sets that supports discovery Review and demonstrate relevant rules Demonstrate worked examples of strategies Free practice supported by verbal coaching

Game 2 688(I) Hunter/Killer	Content	Learning Activities	Game Style	Learner Outcomes	Gagne's Learning Conditions & Blooms Taxonomy
Circle YES or NO	**Creativity**	Play	Puzzles Invention games	Cognitive strategies Problem solving	Verbal description of strategy Demonstrate or strategy Practice with informative feedback Robust example set that supports discovery Review and demonstrate relevant rules Demonstrate worked examples of strategies Free practice supported by verbal coaching.
Circle YES or NO	**Language**	Imitation Continuous practice Immersion	Role Reflex Flashcard	Motor skills	Provide classification practice. Practice with informative feedback Demonstration or verbal instructions with pictures Fading or feedback
Circle YES or NO	**Systems**	Understanding principles Graduated tasks Playing in micro worlds	Simulation	Cognitive strategies Problem solving	Verbal description of strategy Demonstrate or strategy Practice with informative feedback Robust example sets that supports discovery Review and demonstrate relevant rules Demonstrate worked examples of strategies

Game 2 688(I) Hunter/Killer	Content	Learning Activities	Game Style	Learner Outcomes	Gagne's Learning Conditions & Blooms Taxonomy
					Robust example set that supports discovery
Circle YES or NO	**Reasoning**	Problems Examples	Puzzles	Cognitive strategies Problem solving	Verbal description of strategy Demonstrate or strategize Practice with informative feedback. Robust example set that supports discovery. Review and demonstrate relevant rules Demonstrate worked examples of strategies Free practice supported by verbal coaching.
Circle YES or NO	**Process**	System analysis and deconstruction practice	Strategy Adventure	Motor skills	Provide classification practice Practice with informative feedback Demonstration or verbal instructions with pictures Fading or feedback
Circle YES or NO	**Procedures**	Imitation Practice	Timed Reflex	Rules	Demonstration of rules/procedures Variety of examples of rule application Practice in rule application

APPENDIX E
NAVAL TACTICAL TASK LIST (NTTL)
AND GAME OBJECTIVE CROSS REFERENCE MATRIX

Note: All Objectives are written verbatim in order to provide a reliable cross-reference analysis and build a stable database.

McNeese Game Assessment Tool

Naval Tactical Task List (NTTL) Objective Cross Reference Matrix (Sample)

NTTL	Task	Objective	Learner Outcomes	Content	Suggested Game Style	Game Correlation Yes/No
NTA 1	Deploy/Conduct Maneuver	Movement of combat and support units.				
NTA 1.1	Move Naval Tactical Forces.	To move naval units and/or organizations and their systems from one position to another in order to gain a position of advantage or avoid a position of disadvantage with respect to an enemy. Naval mobility ensures that a commander can either seek or avoid an engagement as required either for the completion of the mission or for the protection of own force. This task includes bypassing obstacles and sea mines. It also includes movement of units by a non-organic organization, such as movement of a mine countermeasures (MCM) asset by strategic airlift or commercial sealift.				

McNeese Game Assessment Tool

Naval Tactical Task List (NTTL) and Objectives

NTTL	Task	Objective
NTA 1	Deploy/Conduct Maneuver	Movement of combat and support units.
NTA 1.1	Move Naval Tactical Forces.	To move naval units and/or organizations and their systems from one position to another in order to gain a position of advantage or avoid a position of disadvantage with respect to an enemy. Naval mobility ensures that a commander can either seek or avoid an engagement as required either for the completion of the mission or for the protection of own force. This task includes bypassing obstacles and sea mines. It also includes movement of units by a non-organic organization, such as movement of a mine countermeasures (MCM) asset by strategic airlift or commercial sealift.
NTA 1.1.1	Prepare Forces For Movement	To assemble, inspect, and load personnel, equipment, and supplies in preparation for a tactical movement. It includes procurement and storage of equipment and supplies, staging/marshaling and embarkation of naval forces on air and sea borne assets, estimating throughput, time phasing force movement, and establishing tactical formations. It also includes completion of vital voyage repairs to the naval task force ships prior to movement.
NTA 1.1.1.1	Identify Lift Requirements.	To identify transportation requirements for expeditionary/amphibious/military sealift shipping, maritime preposition shipping, commercial shipping, and/or airlift to support the movement of personnel, equipment, and supplies.
NTA 1.1.1.2 Stage/Marshal Forces	Stage/Marshal Forces	To sortie and assemble expeditionary/amphibious/military sealift shipping and aircraft at embarkation ports. Move ground/air forces and associated equipment to embarkation ports preparatory to loading on board expeditionary/amphibious/military sealift shipping and aircraft.
NTA 1.1.1.3	Embark Forces	To embark forces and equipment on naval (including expeditionary/amphibious and follow-on), military sealift or commercial shipping and aircraft, preparatory to movement to offload area. Includes preparation of loading and berthing plans
NTA 1.1.1.4	Conduct Administrative Off-Load	The non-tactical offload of personnel, supplies, and equipment from naval or commercial shipping.
NTA 1.1.1.5	Conduct Shore-to-Ship Movement	The non-tactical movement of forces, units, or detachments, including personnel, equipment, and supplies, from the shore to naval or commercial shipping.
NTA 1.1.1.6	Reconstitute/ Redeploy the Force	To rapidly restore the fighting potential of the forces for subsequent redeployment through deliberate regeneration and back loading of amphibious shipping.

NTA 1.1.1.7	Prepare Ship for Movement	Includes completion of all standard operating procedures, to include completion of approved pre-underway or prior-to-arriving inport check-off lists. Arranging of port services, preparing and approval of charts with position and intended movement (PIM) tracks laid out on all harbor and transit charts, and conducting a navigation brief.
NTA 1.1.1.7.1	Provide Engineering/Main Propulsion	To conduct engineering procedures and operations to include main propulsion, HVAC, ships services, water and electrical distribution, and other auxiliary systems.
NTA 1.1.1.7.2	Provide Combat Systems/Deck/ Communications	To conduct combat systems (including deck, weapons systems, and communications) procedures and operations, including equipment configuration validation.
NTA 1.1.1.7.3	Provide Damage Control	To conduct damage control procedures and operations to contain, control, limit effects, and restore from conditions resulting from: fire, smoke, flooding, structural damage, toxic gas, hazardous material (HAZMAT) spills, contamination, and other emergency situations
NTA 1.1.2	Move Forces	To move forces/units tactically on or under the sea, through the air, or on the ground. This movement includes the positioning of ships, submarines, aircraft, and ground forces.
NTA 1.1.2.1	Establish Naval Cooperation and Guidance for Shipping (NCAGS)	To establish control over and protect shipping. Includes passive procedures for naval cooperation and guidance for shipping and the active procedures of movement, routing, reporting, convoy organization, and tactical diversion of allied merchant shipping in time of crisis.
NTA 1.1.2.2	Move Embarked Forces	To move forces from point of embarkation to operational area
NTA 1.1.2.3	Move Units	To coordinate and execute the movement of ships, aircraft, or ground forces.
NTA 1.1.2.3.1	Sail Ship from Port, Anchorage, or Moorage	To get a ship underway from its place of moorage to sea. This task includes safe and efficient execution of all procedures applicable to getting underway including navigation procedures, rules of the road, and emergency procedures.
NTA 1.1.2.3.2	Return Ship to Port, Anchorage, or Moorage	To sail a ship from sea or other underway operations to a moorage or anchorage. This task includes safe and efficient execution of all procedures applicable to getting underway including navigation procedures, rules of the road and emergency procedures.
NTA 1.1.2.3.3	Conduct Flight Operations	To conduct fixed-wing, tilt-rotor, and helicopter flight operations from shore airfields including expeditionary airfields and from aboard ship including ships. Provide safe all weather air operations.
NTA 1.1.2.3.3.1	Conduct Aviation Qualification	To qualify pilots and other air wing crews in flight operations, especially landing operations, around and aboard ships

NTA 1.1.2.3.3.2	Launch Aircraft	To launch aircraft from ships. This task covers all fixed-wing, tilt-rotor, and helicopter aircraft launch operations from ships, surface combatants and all other applicable sea vessels. This task requires the safe and efficient execution of all procedures applicable to launch, including: pre-launch procedures, launch procedures, instrument and visual departure procedures, departure communications procedures, departure rendezvous procedures, emergency recovery procedures, tanker procedures, and procedures for diversion of aircraft.
NTA 1.1.2.3.3.3	Recover Aircraft	To recover aircraft onboard ships. This task covers all fixed-wing, tilt-rotor, and helicopter aircraft recovery operations on combat support ships, surface combatants and all other applicable sea vessels. This task requires the safe and efficient execution of all procedures applicable to recovery, including: arrival procedures, marshal procedures, instrument and visual approach procedures, arrival communications procedures, emergency landing procedures, tanker procedures, and procedures for diversion of aircraft
NTA 1.1.2.3.3.3.1	Rig and Operate CV/CVW with MOVLAS	To land aircraft on board the CV using a manually operated visual aids landing system (MOVLAS). (NAVAIR 00-08T-113 Aircraft Signals NATOPS Manual, NAVAIR 00-80T-105 CV NATOPS Manual)
NTA 1.1.2.3.4	Conduct Convoy Operations	To move ground and support forces over land by convoy.
NTA 1.1.2.3.5	Conduct Wet Well Operations	To conduct wet well operations to include ballasting, de-ballasting, launch and recovery of landing craft air cushion (LCAC), landing craft utility (LCU), amphibious assault vehicles (AAVs), and other landing craft and support craft, which may be embarked in the well deck, providing safe all weather operations.
NTA 1.1.2.3.6	Control Landing Craft	To conduct positive control of all landing and support craft which are operating between amphibious ships and either the beach or other ships.
NTA 1.1.2.3.7	Conduct Small Boat Operations	To operate small boats to include the launch, recovery, loading, and unloading of small boats.
NTA 1.1.2.3.8	Conduct Submerged Operations	To deliver and extract personnel and equipment. Includes, but is not limited to, parachute (static line or free fall), fastrope, rappel, special purpose insertion/extraction (SPIE), and combat rubber raiding craft, lock-in/lock-out from submerged submarines and other underwater vehicles.
NTA 1.1.2.5	Employ Remote Vehicles	To operate vehicles such as robots, drones, unmanned underwater vehicles (UUVs), unmanned aerial vehicles (UAVs), and other devices from a local control station. This task includes deployment, launch, control, and recovery operations.
NTA 1.2	Navigate and Close Forces	To determine the optimum track for the movement of naval forces in tactical formations, to overcome the challenges presented by terrain, obstacles, enemy area denial efforts including mines, and weather, and to complete movement or deployment. of naval forces into a tactical position. To include determining distance, direction, location, elevation/altitude, route, data for navigational aids, orientation, and rate of movement.

NTA 1.2.1	Establish Force Area Operations Coordination	To provide for coordination of movement among force elements. This task ensures all naval forces share a common relevant picture of the battlespace for the purpose of deconflicting movement of air, sea, and land forces.
NTA 1.2.1.1	Establish a Plan for Water Space Management and the Prevention of Mutual Interference	To provide for water space management to prevent inadvertent attacks against friendly forces and mutual interference between subsurface, surface, and other force elements. Other force elements includes items such as towed sonar array, mine countermeasures, or other towed objects at subsurface depths including torpedoes, ordnance, fuel tanks, etc
NTA 1.2.1.2	Conduct Air Space Management and Control	To deconflict and control friendly/neutral air assets.
NTA 1.2.1.3	Establish Amphibious Objective Area (AOA) or Area of Operations (AO)	To provide tactical control within a defined operational area (OA) inside of which amphibious operations will be conducted. This task deconflicts forces conducting ship-to-shore movement or ship-to-objective maneuver, integrates these forces into the naval force's tactical picture, and coordinates ship-to-objective maneuver with fire support and mine hunting/clearance measures. It includes promulgation of necessary operational and tactical information to put the AOA or AO into effect.
NTA 1.2.1.4	Establish Procedures for Control and Conduct of Relief Operations	To plan, establish procedures, and control and conduct replacement of one unit for another to conserve the combat power and effectiveness of the element being relieved, to ensure maintenance of the initiative in a tactical situation, or as part of the tactical plan. This may take the form of a relief in place, a passage of lines, or a withdrawal through a rearward position. Relief in place is when all or part of a unit is replaced in a combat area by an incoming unit. Passage of lines is when an incoming unit attacks through a unit, which is in contact with the enemy. Withdrawal through a rearward position is when a unit effecting a retrograde movement passes through the sector of a unit occupying a rearward defensive position.
NTA 1.2.1.5	Determine Command Relationships for the Force	To determine the command authorities to be observed between all components of the force during all phases of the anticipated operation. The command relationships include the joint authorities of support, tactical control (TACON), and operational control (OPCON) and will be designated by the establishing authority of the operation.
NTA 1.2.2	Stage Forces	To assemble the appropriate elements within assigned ships, aircraft, and vehicles for movement prior to tactical maneuver. This task includes staging forces in preparation for joining with pre-positioned equipment, positioning forces in a holding area, performing final checks, debarking amphibious, MPF, or military sealift ships to load into landing craft, moving to attack points, and establishing initial tactical formations.

NTA 1.2.3	Conduct Hydrographic Surveys	To conduct pre-landing surveys of planned beaches/landing sites/ports to determine ability to support amphibious operations. Hydrographic surveys may be conducted covertly and/or clandestinely. Survey of port facilities to support offload of shipping, and survey of sites for emplacement of joint logistics over-the-shore/logistics over-the-shore (JLOTS/LOTS) may be conducted overtly by subject matter experts. To include: Bottom mapping of sea lines of communications (SLOC) and surveys of seaports of debarkation/embarkation (SPOD/SPOE) and Q-routes to support mine countermeasures operations.
NTA 1.2.4	Perform Surf Observations (SUROBS)	To conduct observation of local surf conditions and enemy positions in a timely manner to provide commanders with necessary information to determine the ability of landing forces to conduct ship-to-shore movement. SUROBS may be conducted overtly for administrative purposes or conducted covertly and/or clandestinely for operational purposes.
NTA 1.2.5	Conduct Terrain Analysis	To conduct analysis of planned operational area ashore via operator review of processed data.
NTA 1.2.6	Conduct Climatological and Meteorological Analyses	To determine climatological and meteorological conditions and limitations which may affect or impair operations (both afloat and ashore). To include weather observation, collection, analysis, forecasting, determination of tidal and current conditions, predicted surf conditions, storm evasion tracks, and storm sanctuary sites.
NTA 1.2.7	Conduct Tactical Oceanographic Analysis	To determine the characteristics of the ocean and ocean bottom in order to analyze all factors to determine their impact on naval tactics and operations.
NTA 1.2.8	Conduct Tactical Reconnaissance and Surveillance	To conduct on-site reconnaissance of the enemy situation to confirm and validate the limiting and enhancing effects of terrain on enemy and friendly capabilities in order to minimize the threat (includes both overt and covert means).
NTA 1.2.8.1	Conduct Route and Road Reconnaissance	To confirm historical data through on-site reconnaissance to determine critical routes, roads, and key terrain in a timely manner to determine impact on planned or contingency operations. This task includes both hasty and deliberate surveys in support of the landing force.
NTA 1.2.8.2	Conduct Helicopter Landing Zone Reconnaissance	To confirm historical data through on-site reconnaissance of a proposed helicopter landing zone (HLZ), site, or point. Normally a clandestine operation for determining the suitability of the objective area for helicopter operations.
NTA 1.2.8.3	Conduct Airborne Reconnaissance and Surveillance	Support and conduct surveillance of enemy territory and geographic area for the purpose of determining enemy positions and composition.
NTA 1.2.9	Perform Initial Terminal Guidance (ITG)	To perform initial terminal guidance for the conduct of air/surface operations for initial/follow-on landing forces utilizing visual/electronic navigational aids. Normally ITG tasks are conducted in a clandestine manner.
NTA 1.2.10	Conduct Beach Party Operations	To conduct beach party operations or provide naval element of the shore party to facilitate the loading and movement over the beaches of troops, equipment, and supplies, to assist the evacuation of casualties/prisoners of war or to salvage landing assets as required.

NTA 1.2.11	Conduct Navigation	To plan, record, and control the course of an individual, unit, vehicle, ship, or aircraft, or battle/strike group/force on ground, air, or sea. This includes maneuvering ships, aircraft and other units into position to strike targets at sea, or to conduct amphibious operations at multiple locations.
NTA 1.2.12	Maneuver in Formation	Tactically maneuver forces in formation.
NTA 1.3	Maintain Mobility	To maintain freedom of movement for ships, aircraft, landing craft, personnel, and equipment in the battlespace without prohibitive delays due to terrain, weather (environmental effects), or barriers, obstacles, and area denial efforts including mines.
NTA 1.3.1	Perform Mine Countermeasures	To detect, identify, classify, mark, avoid, neutralize, and disable (or verify destruction of) and exploit mines using a variety of methods including air, surface, and subsurface assets.
NTA 1.3.1.1	Conduct Mine Hunting	To detect, locate, and mark mines that present a hazard to force mobility in an overt, covert, and/or clandestine manner. The employment of sensor systems (including air, surface, and subsurface assets) to locate and dispose of individual mines. Mine hunting is conducted to determine the presence or absence of mines in a given area.
NTA 1.3.1.1.1	Reacquire Minelike Contacts (MILC)	To reacquire a MILC using one or more of several search techniques, to include all surface, air and underwater techniques.
NTA 1.3.1.1.2	Identify Minelike Contacts (MILC)	To identify a MILC through various observation techniques (i.e. divers' eyes-on, remotely operated vehicle (ROV) pictures, and live or recorded video) as either a mine or non-mine
NTA 1.3.1.2	Conduct Minesweeping	To clear mines using either mechanical or influence sweep equipment. Mechanical sweeping removes, disturbs, or otherwise neutralizes the mine; influence sweeping produces either the acoustic and/or magnetic influence required to detonate the mine.
NTA 1.3.1.3	Conduct Mine Neutralization	To render (by external means) mines incapable of firing on passage of a target, although the mines may remain dangerous to handle.
NTA 1.3.1.4	Conduct Mine Exploitation	To recover, disassemble, and exploit mines at an exploitation site separate from other units in order to gather intelligence on firing mechanisms and warhead design.
NTA 1.3.2	Conduct Breaching of Minefields, Barriers, and Obstacles	To employ any means available to break through or secure a passage through an enemy defense, obstacle, minefield, or fortification. This enables a force to maintain its mobility by removing or reducing natural and man-made obstacles.
NTA 1.3.2.1	Mark Barriers and Obstacles	To use marking devices and/or personnel to identify and control barriers, obstacles, or contaminated areas in order to protect friendly forces and noncombatants.
NTA 1.3.2.2	Clear Minefields, Barriers, and Obstacles	To provide for clearance of barriers and obstacles from an operational area. To remove and/or neutralize mines from a route or an area to prevent interference with friendly or neutral forces and noncombatants.
NTA 1.3.2.3	Transit Mine Threat Area	To move forces through a known mine threat area/swept channel utilizing approved Q-routes.

NTA 1.3.3	Enhance Force Mobility	To enhance the movement of the force from place to place while retaining its ability to fulfill its primary mission. It includes constructing, improving, and repairing piers, wharves, roads and trails, bridges, ferries, forward airfields and landing sites/zones, and by facilitating movement on routes (road and air traffic control; refugee and straggler control). This task also includes clearing, dredging, and establishing aids to navigation (ATON) in required harbor areas.
NTA 1.3.4	Conduct Icebreaking	To provide ice breaking or clearing service to maintain SLOCs, to ensure vessel access to port facilities and waterways, and to project US national presence and protect US national interests.
NTA 1.4	Conduct Countermobility	To construct obstacles and employ area denial efforts including mines to delay, disrupt, and destroy the enemy. The primary purpose of countermobility operations is to slow or divert the enemy, to increase time for target acquisition, and to increase weapons effectiveness.
NTA 1.4.1	Conduct Mining	To use air, ground, surface, and subsurface assets to conduct offensive (deploy mines to tactical advantage of friendly forces) and defensive (deploy mines for protection of friendly forces and facilities) mining operations.
NTA 1.4.1.1	Plan Minefields	To sequentially develop an integrated plan to emplace minefields which will effectively support the tactical plan. Planning consists mainly of establishing obstacle restrictions at higher-level units and detailed design and citing at lower level units.
NTA 1.4.1.2	Report Minefields	To document intention to lay, initiation of laying, completion of laying, and changes to minefields.
NTA 1.4.1.3	Record Minefields	To record conventional minefields to determine mines emplaced and their locations.
NTA 1.4.1.4	Mark Minefields	To identify minefields and cleared lanes through or around obstacles. This task contributes to momentum, confidence in the safety of the lane, and prevents casualties.
NTA 1.4.2	Place Barriers and Obstacles	To strengthen the existing operational area to slow, stop, or channel the enemy. Actions under this task could include planning, reporting, recording of barriers and obstacles, removal of aids to navigation, and placement of navigational hazards
NTA 1.4.3	Mark Barriers and Obstacles	To use marking devices (including signs, posts, flags, etc.) and/or personnel to identify and control barriers, obstacles, or contaminated areas in order to protect friendly forces and noncombatants.
NTA1.4.4	Detonate Mines/Explosives	To cause the explosion and the resulting destruction of enemy personnel, vehicles, aircraft, vessels (ships and submarines), obstacles, facilities, or terrain.
NTA 1.4.5	Conduct Blockade	To blockade designated areas in conjunction with U.S. policy.
NTA 1.4.6	Conduct Maritime Interception	To intercept commercial, private or other non-military vessels and conduct Visit, Board, Search and Seizure (VBSS) procedures. Includes operations to counter smuggling and/or resource exploitation based on the authority of the United Nations or other sanctioning body.
NTA 1.4.6.1	Conduct Visit	To board a ship, aircraft, or other vessel or transport to inspect and examine the vessel's papers or examine it for compliance with applicable resolutions or sanctions.
NTA 1.4.6.2	Conduct Search	To inspect or examine a ship or other vessel to determine

		compliance with applicable resolutions or sanctions.
NTA 1.4.6.3	Conduct Seizure	To confiscate or take legal possession of vessel and contraband (goods or people) found in violation of resolutions or sanctions
NTA 1.4.6.4	Escort Detained Vessels	To escort detained vessels and ensure health, safety, and welfare of detained crew until turned over to appropriate legal authorities.
NTA 1.4.6.5	Stop/Neutralize Noncompliant Vessels	To seize and secure a ship or vessel that is resisting the attempt to board and search.
NTA 1.4.7	Enforce Exclusion Zones	To use necessary means to deny use of an air or sea area to a designated force or forces.
NTA 1.4.8	Conduct Maritime Law Enforcement	To patrol and intercept vessels for potential boarding, inspection, and possible search, and seizure in order to enforce applicable U.S. law (e.g. counterdrug, fisheries, pollution, boating safety, or immigration). Foreign laws may be enforced with the approval of the flag state.
NTA 1.4.8.1	Conduct Alien Migrant Interdiction Operations	To intercept alien migrants at sea, rescue them from unsafe conditions, and prevent their passage to US waters and territory.
NTA 1.4.8.2	Conduct Maritime Counterdrug (CD) Operations	To coordinate with all applicable agencies to detect and monitor vessel and air traffic and provide vessels and qualified boarding teams to intercept, board, inspect, search, and as appropriate seize, vessels suspected of smuggling drugs.
NTA 1.5	Dominate the Operational Area	To dominate or control land, airspace, and/or sea space to prevent enemy or other force occupation or use of the area through fire, fire potential, or occupation.
NTA 1.5.1	Control or Dominate the Area Through Employment of Combat Systems	To use combat systems or the threat of combat systems on or in a geographic land area or ocean area to prevent the enemy or other forces from occupying or using the area, and permit friendly forces to occupy or use the area, including the introduction of amphibious forces. Dominate a land area, airspace, or sea space to prevent enemy or other force occupation or use of the combat area through fire, fire potential, or occupation.
NTA 1.5.1.1	Maneuver Naval Forces	To move available units, personnel and equipment, and combat systems into appropriate locations to conduct screening, attack, or provide battlespace dominance. Includes conducting ship-to-shore or ship-to-objective maneuver to gain a tactical advantage over the enemy in terms of both time and space or to place them in a desired position for other purposes, such as safe navigation of units in formation, preparation to conduct along side replenishment or refuel from other aircraft, or conduct coordinated search operations
NTA 1.5.1.2	Occupy Battlespace	To physically position forces on the sea, on the ground, or in the air, thus dominating these areas and preventing the enemy from doing so. It includes enforcing exclusion zones, occupying fighting or support positions, and control of specific sea-lanes, choke points, and river waterways.
NTA 1.5.2	Conduct Amphibious Operations	To conduct a military operation launched from the sea by a naval and landing force embarked in ships or craft, with the principal purpose of projecting the landing force ashore tactically into an environment ranging from permissive to hostile

NTA 1.5.2.1	Conduct Ship-to-Shore or Ship-to-Objective Maneuver	To conduct ship-to-shore or ship-to-objective maneuver to gain a tactical advantage over the enemy in terms of both time and space. Maneuver is not aimed at the seizure of a beach, but builds upon the foundations of expanding the battlespace.
NTA 1.5.2.1.1	Deploy Coordinated Strike Forces	To employ combined arms attacks of varying size, frequency, and composition to achieve operational effect.
NTA 1.5.2.1.2	Support Coordinated Strike Forces	To support combined arms attacks from the sea without establishing bases ashore.
NTA 1.5.2.2	Conduct an Amphibious Assault	To conduct an amphibious operation that involves establishing a force on a hostile or potentially hostile shore.
NTA 1.5.2.2.1	Conduct Forcible Entry in Amphibious Objectives Area (AOA) or Area of Operations (AO)	To seize and hold a tactical lodgment within AOA or AO, opposed or unopposed, to strike directly at an enemy's critical vulnerabilities, or to gain access into an AOA or AO and conduct decisive operations. Forcible entry into an area may be applicable for military operations other than war (MOOTW), e.g., secure an area for peace enforcement forces or non-combatant evacuation.
NTA 1.5.2.2.2	Seize and Hold Lodgment	To attack and secure a designated area in a hostile or threatened area, which ensures the continuous landing of troops and materiel and provides the maneuver space necessary for projected operations to be supported and extended throughout the area of operations.
NTA 1.5.2.2.3	Buildup the Force	To rapidly buildup from an initial small power base to a force capable of securing and protecting the lodgment area (and units within it) against enemy counterattacks and hostile acts by nonmilitary elements of the local population. To buildup a logistics organization within the lodgment area to support operations.
NTA 1.5.2.2.4	Stabilize the Lodgment	To preempt or defeat enemy counterattacks in the lodgment area, expand the initial entry point(s) for the continuous and uninterrupted flow of additional forces and materiel into the area and provide sufficient space for freedom of action by the tactical forces. To sequence combat, SOF, CS and CSS forces into the lodgment area. To link the force with combat forces within or external to the lodgment area
NTA 1.5.2.2.5	Insert Follow-On Forces	To enter follow-on forces into the lodgment area to breakout and continue operations to accomplish the final objectives of the operation or, if necessary, to help secure the lodgment before continuing the operation.
NTA 1.5.2.3	Conduct an Amphibious Demonstration	To employ amphibious forces for the purpose of deceiving the enemy by a show of force with the expectation of deluding the enemy into taking a course of action unfavorable to him.
NTA 1.5.2.4	Conduct an Amphibious Raid	To employ amphibious forces for the purpose of making a swift incursion into or temporary occupation of an objective followed by a planned withdrawal.
NTA 1.5.2.5	Conduct an Amphibious Withdrawal	To employ amphibious forces for the purpose of extracting forces by sea in naval ships or craft from a hostile or potentially hostile shore.

NTA 1.5.3	Conduct Attack	To take offensive action characterized by coordinated movement supported by fire to defeat, destroy, or neutralize the enemy. Attack includes hasty, deliberate, spoiling and counter-attacks, reconnaissance in force, raids, feints, and demonstrations. Forms of maneuver for conducting attack include frontal attack, penetration, infiltration, flank attack, envelopment (single and double), and turning movement.
NTA 1.5.3.1	Conduct Hasty Attack	To conduct an attack in land operations in which preparation time is traded for speed in order to exploit an opportunity.
NTA 1.5.3.2	Conduct Deliberate Attack	To conduct an attack characterized by preplanned coordinated employment of fires and maneuver to close with and destroy or capture the enemy. A deliberate attack is planned and carefully coordinated and rehearsed with all concerned elements based on thorough reconnaissance, evaluation of available intelligence and relative combat strength, analysis of various courses of action, and other factors affecting the situation. It generally is conducted against a well-organized defense when a hasty attack is not possible or has been conducted and failed.
NTA 1.5.3.3	Conduct Raid	To conduct deliberate attack, usually small-scale, involving a swift penetration of hostile territory to secure information, to confuse the enemy, or to destroy his installations. It ends with a planned withdrawal back to friendly territory upon completion of the assigned mission
NTA 1.5.3.4	Conduct Feint	To conduct a limited objective attack used as a deception intended to draw the enemy's attention away from the area of the main attack. A feint is designed to induce the enemy to move his reserves or to shift his fire support in reaction to the feint. Feints must appear real and therefore require some contact with the enemy.
NTA 1.5.3.5	Conduct Demonstration	To conduct a limited objective attack or show of force on a front where a decision is not sought. The demonstration is made with the aim of deceiving the enemy. A demonstration is similar to a feint, with the exception that no contact with the enemy is sought.
NTA 1.5.4	Conduct Defense	To take action to defeat an enemy attack and regain the initiative. This task is performed to buy time, to hold a piece of key terrain, to facilitate other operations, to preoccupy the enemy in one area so friendly forces can attack him in another, or to erode enemy resources at a rapid rate while reinforcing friendly operations.
NTA 1.5.4.1	Conduct Security	To obtain information about the enemy and provide reaction time, maneuver space, and protection to the main body. Security is characterized by aggressive reconnaissance to obtain information about terrain and enemy, gaining and maintaining contact with the enemy to ensure continuous information, and providing early and accurate reporting of information to the protected force. Security operations include screen, guard, cover, and area security.
NTA 1.5.4.1.1	Conduct Screen	To maintain surveillance; provide early warning (primary purpose) to the main body; or impede, destroy, and harass enemy reconnaissance within the screening force's capability.

NTA 1.5.4.1.2	Conduct Cover	To develop the situation early and deceive, disorganize, and destroy enemy forces. To accomplish all tasks of screening and guard forces in addition to cover. To operate apart from the main force and be tactically self-contained and capable of operating independently of the main body in an offensive or defensive mission and, as necessary, become decisively engaged with enemy forces.
NTA 1.5.4.1.3	Provide Area Security	To provide security of designated personnel, airfields, unit convoys, facilities, main supply routes, lines of communications, equipment, and critical points.
NTA 1.5.4.1.4	Secure an Area	To neutralize or defeat enemy operations in a specified area delineated by the headquarters assigning the security mission. Area security is offensive or defensive in nature and focuses on the enemy, the force being protected, or a combination of the two. To deny the enemy the ability to influence friendly actions in a specific area or to deny the enemy use of an area for his own purposes.
NTA 1.5.4.1.5	Secure and Protect LOCs and Routes in AO	To prevent enemy ground maneuver forces or insurgents from engaging friendly forces with direct fire on a protected route. Providing route security on and to the flanks of a designated route, defensive in nature and terrain oriented. To prevent an enemy force from impeding, harassing, containing, seizing, or destroying traffic along the route/LOC. Includes continuous mounted and dismounted reconnaissance of route and key locations to ensure trafficability; conduct sweeps of the route to prevent emplacement of enemy mines along the route; search suspected enemy locations; establish roadblocks traffic control points and checkpoints; occupy key locations and terrain; and conduct patrols.
NTA 1.5.4.2	Conduct Delay	To maneuver forces that are insufficient to attack or defend or when the design of the operation dictates maneuvering the enemy into an area for subsequent counterattack. To gain time for friendly forces to reestablish the defense, to cover a defending or withdrawing unit, to protect a friendly unit's flank, and to participate in an economy-of-force effort or to slow or break up enemy momentum.
NTA 1.5.5	Conduct Ground Tactical Enabling Operations	To perform specific actions peculiar to several forms and types of ground maneuver. These include, patrolling (of various types), linkup, passage-of-lines, and relief in place. These actions occur during offensive, defensive, and retrograde operations for different purposes.
NTA 1.5.5.1	Conduct Patrols	To use a detachment of ground, sea, or air forces to gather information or carry out a destructive, harassing, mopping-up, or security mission.
NTA 1.5.5.2	Conduct Passage-of-Lines	To move a force forward or rearward through another force's combat positions with the intention of moving into or out of contact with the enemy

NTA 1.5.5.3	Conduct Relief in Place	To replace all or part of another unit with an incoming unit (relieving unit) which usually assumes the same responsibilities and deploys initially in the same configuration as the outgoing unit. Relief in place is executed for a number of reasons, including: introducing a new unit into combat, changing a unit's mission, relieving a depleted unit in contact, retraining a unit, relieving the stress of prolonged operations in adverse conditions, resting a unit after long periods in mission-oriented protective posture (MOPP), decontaminating a unit, and avoiding excessive radiation exposure.
NTA 1.5.5.4	Cross Rivers and Gaps	To pass through or over any battlefield terrain feature, wet or dry, that is too wide to be negotiated in stride with organic transportation or overcome by self-bridging. To cross quickly rivers or streams in the path of advance. A river crossing requires special planning and support. The size of the obstacle and the enemy situation will dictate how to make the crossing without losing momentum. Preferably, it is a hasty crossing without losing momentum; it could be deliberate crossing requiring major support and planning based on the enemy's disposition and knowledge of the friendly force. This task includes river crossing in retrograde. This task also includes preparing and/or improving access and egress points, and employing bridging (e.g., assault gap, assault float, follow-on float bridges, or constructing military standard or non-standard fixed bridges, or constructing rafts and other expedients).
NTA 1.5.6	Enhance Movement	To enhance force mobility in the combat area by constructing or repairing combat roads and trails, forward airfields and landing zones, and by facilitating movement on routes (road and air traffic control; refugee and straggler control).
NTA 1.5.6.1	Construct/Repair Combat Roads and Trails	To prepare or repair routes of travel for equipment or personnel. Task includes survey and assessment, delineating routes and sites, clearing ground cover, performing earthwork, providing drainage, stabilizing soil, and preparing surface.
NTA 1.5.6.2	Construct/Repair Forward Airfields and Landing Zones	To prepare or repair landing zones, expeditionary airfields, landing strips to support aviation ground facility requirements in the forward battle area
NTA 1.5.6.3	Facilitate Movement on Routes	To employ Navy forces that are specially trained, equipped, and organized to conduct special operations in maritime, littoral, and riverine environments.
NTA 1.5.7	Conduct Naval Special Warfare	To conduct military and paramilitary activities including guerrilla warfare and other direct offensive, low-visibility, covert and/or clandestine operations, as well as indirect activities of subversion and sabotage. This task also includes, when appropriate, integration and synchronization of indigenous and surrogate forces that are organized, trained, equipped, supported, and directed by an external source.

NTA 1.5.8	Conduct Unconventional Warfare	To establish and maintain information superiority in assigned operating area through employment of both offensive and defensive information operations (IO). Offensive IO involve the integrated use of assigned and supporting capabilities and processes, mutually supported by intelligence, to affect information systems to achieve or promote specific objectives. Defensive IO processes, integrates, and coordinates polices and procedures, operations, personnel, and technology to protect information and to defend information systems. Defensive IO is conducted through information assurance, physical security, counterdeception, counterpropaganda,
NTA 1.5.9	Conduct Information Superiority	counterintelligence, electronic protection and special information operations. Defensive IO objectives ensure timely, accurate, and relevant information access while denying adversaries the opportunity to exploit friendly information and systems for their own purposes.
NTA 2	DEVELOP INTELLIGENCE	To develop intelligence that is required for planning and conducting tactical operations. Analyzing the enemy's capabilities, intentions, vulnerabilities, and the environment (to include weather and the application of tactical decision aids and weather effects matrices on friendly and enemy systems, and terrain) derives it. This task includes the development of counterintelligence information.
NTA 2.1	Plan and Direct Intelligence Operations	To assist tactical commanders in determining and prioritizing their intelligence requirements (IR), to enable them to plan and direct intelligence, counterintelligence, and reconnaissance operations to satisfy these requirements. This task requires oversight of the intelligence cycle process, which includes the identification, validation, and prioritization of IRs; the planning and directing of intelligence operations; planning, managing, and tasking of collection operations; processing and exploiting data; analyzing data and producing intelligence; disseminating intelligence; integrating intelligence with operations; and providing evaluation and feedback to ensure effective and efficient intelligence support to operations.
NTA 2.1.1	Determine and Prioritize Priority Intelligence Requirements (PIR)	To assist tactical commanders in determining their PIRs and remaining IRs. PIRs are those critical pieces of intelligence the commander must know by a particular time to plan and execute a successful mission. PIRs are identified at every level and based upon guidance obtained from the mission statement, commander's intent, and end-state objectives.
NTA 2.1.2	Determine and Prioritize Intelligence Requirements (PIR)	To identify and prioritize those items of information that must be collected and processed to develop the intelligence required to fill a gap in the command's knowledge and understanding of the battlespace or enemy forces. Those intelligence requirements that are most critical or that would answer a PIR are known as essential elements of information (EEIs).
NTA 2.1.3	Conduct Collection Planning and Directing	To convert IRs into collection requirements; to establish priorities; to task or coordinate with appropriate organic, supporting and external intelligence, counterintelligence, and reconnaissance sources and agencies; to integrate among collection units; to integrate collections with production and dissemination; to monitor ongoing operations and results; and to retask as required. Collection requirements management focuses

		on the requirements of the customer, is all-source oriented, and advocates what information is needed for collection. To develop a collection plan that will satisfy the commander's intelligence requirements. Collection planning includes assigning the appropriate collection capabilities to fulfilling specific intelligence requirements. The plan must include obtaining intelligence from all sources (national, theater, and tactical).
NTA 2.1.4	Conduct Production Planning and Directing	To determine the scope, content, and format of each intelligence product; to develop a plan and schedule for the development of each product; to assign priorities among the various production requirements; to allocate processing, exploitation and production resources; and to integrate production with collection and dissemination.
NTA 2.1.5	Conduct Dissemination Planning and Directing	To establish dissemination priorities, integrate dissemination with collection and production, select dissemination means, and monitor the flow of intelligence throughout the command and to external forces. It also includes providing for use of security controls that do not impede the timely delivery or subsequent use of intelligence while protecting intelligence sources and methods.
NTA 2.1.6	Allocate Intelligence Resources	To assign adequate resources to tactical intelligence organizations to permit accomplishment of assigned intelligence tasks. To design and establish the structure necessary to provide intelligence and counterintelligence support throughout the operation. This task includes task organization of intelligence, counterintelligence, and reconnaissance units; and identification of critical and additional personnel and equipment requirements. It also includes identifying and readying intelligence liaison teams; planning and establishing communications and information systems (CIS) connectivity with other services, joint, theater, national, and multinational intelligence organizations and assets as required; identifying and obtaining unique intelligence logistics support; and identifying and obtaining specialized capabilities (e.g., linguists)
NTA 2.1.7	Supervise Intelligence, Counter-Intelligence, and	To monitor and assess the effectiveness of intelligence, counterintelligence, and reconnaissance operations to ensure they focus on all supported commanders' PIRs, intent, and concepts of operations; to quickly identify and solve problems; to rapidly identify situations requiring changes to previously developed plans; and to identify new IRs and implement planning in support of future operations.
NTA 2.2	Perform Collection Operations and Management Reconnaissance Operations	To gather data, information, and previously produced intelligence from all sources to satisfy the identified requirements. Collection involves mission planning, positioning of assets to locations that are favorable to satisfying collection objectives, data collection, reporting of acquired information, and continuous gathering of relevant information and intelligence from sources that are already on-hand or that are available from other intelligence organizations.

NTA 2.2.1	Collect Target Information	To acquire information that supports the detection, identification, location, and operational profile of enemy targets in sufficient detail to permit attack by friendly weapons. Activities include searching for, detecting, and locating targets; and then tracking to include information such as range, bearing, altitude/depth, latitude/longitude, grid, and course and speed of the target. It also includes conducting post-attack battle damage assessment (BDA) and identifying follow-on targets. This task includes optimizing the use of organic collection assets to provide bomb hit assessment (BHA) in search of (ISO) BDA for targeting cycle and re-strike assessment.
NTA 2.2.2	Collect Tactical Intelligence on Situation	To obtain information that affects a commander's possible courses of action. Considerations include the characteristics of the area of operations and the enemy situation. Information includes threat, physical environment, health standards/endemic disease, and social/political/economic factors. This task also includes the reporting and locating of isolated or captured personnel.
NTA 2.2.3	Perform Tactical Reconnaissance and Surveillance	To obtain, by various detection methods, information about the activities of an enemy or potential enemy or tactical area of operations. This task uses surveillance to systematically observe the area of operations by visual, aural, electronic, photographic, or other means. This includes development and execution of search plans.
NTA 2.2.3.1	Search Assigned Areas	To conduct a search/localization plan utilizing ordered search modes/arcs.
NTA 2.2.3.2	Perform Tactical Reconnaissance	To obtain by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy or about the meteorological, hydrographic, or geographic characteristics of a particular tactical area of operations.
NTA 2.2.3.3	Perform Zone Reconnaissance	To conduct a directed effort to obtain detailed information concerning all routes, obstacles (to include chemical or radiological contamination), terrain, and enemy forces within a zone defined by boundaries. A zone reconnaissance normally is assigned when the enemy situation is vague or when information concerning cross-country trafficability is desired.
NTA 2.2.3.4	Perform Area Reconnaissance	To conduct a form of reconnaissance that is a directed effort to obtain detailed information concerning the terrain or enemy activity within a prescribed area, such as a town, ridgeline, woods, or other feature critical to operations.
NTA 2.2.3.5	Perform Reconnaissance in Force	To form a reconnaissance operation designed to discover or test an enemy's strength or to obtain other information.
NTA 2.2.3.6	Collect Tactical Intelligence on Ordnance and Munitions	To obtain, by various detection methods, information regarding an enemy or potential enemy's ordnance and munitions which could be utilized against friendly forces. Includes the use of visual, electronic, aural, photographic or any other means available.
NTA 2.2.4	Assess Tactical Environment	To utilize organic and non-organic sensors to detect combat threats, environmental conditions, geographic constraints and background shipping.

NTA 2.3	Process And Exploit Collected Information and Intelligence	To convert collected data and previously produced intelligence into information forms suitable for the production of intelligence.
NTA 2.3.1	Conduct Technical Processing and Exploitation	To perform activities such as imagery development and interpretation, document translation, electronic data conversion into standardized formats, and decryption of encoded material.
NTA 2.3.2	Correlate Information	To associate and combine data on a single subject to improve the reliability or credibility of the information. This task includes collating information (identifying and grouping related items of information for critical comparison).
NTA 2.4	Conduct Analysis and Produce Intelligence	To appraise information for pertinence, reliability, and accuracy.
NTA 2.4.1	Evaluate Information	To integrate new data and information with other relevant information and intelligence to assist in the formation of logical estimates of enemy capabilities, limitations, courses of action, and intentions.
NTA 2.4.2	Integrate Information	To determine the significance of information and its effects on the current intelligence estimate; to form logical conclusions that bear on the situation and support the commander's decision-making process.
NTA 2.4.3	Interpret Information	To assess, synthesize and fuse new information and existing intelligence from all sources to develop timely, accurate mission-focused intelligence estimates in order to provide meaningful knowledge pertinent to the supported commanders' current and future planning and decision making needs, and to determine the significance of information in relation to the current situation.
NTA 2.4.4	Analyze and Synthesize Information	To assess threats to the friendly tactical force (including threats to forces of multinational partners). This task includes assessing potential issues and situations that could impact U.S. national security interests and objectives within the area of operations.
NTA 2.4.4.1	Identify Issues and Threats	To determine and analyze the nature and characteristics of the area of operations and area of interest, and to identify gaps in currently available intelligence. To determine the types and scale of operations that are supportable and the impact of significant regional features and hazards on the conduct of both friendly and enemy operations.
NTA 2.4.4.2	Define the Battlespace Environment	To evaluate the physical and civil (political, cultural, and economic) environments of the battlespace in order to identify the impact of environment on both friendly and enemy forces. The assessment includes an evaluation of the impact of significant regional characteristics such as the political, economic, industrial, geographic, demographic, topographic, hydrographic, and climatic characteristics. It also includes an impact evaluation of the population's cultural, educational, medical, linguistic, religious, historical, and psychological characteristics.

NTA 2.4.4.3	Evaluate the Battlespace Environment	To evaluate and assess threat (or potential threat) forces, military and non-military capabilities, limitations, centers of gravity, and critical vulnerabilities. To assess the enemy in terms of mobilization potential, order of battle (ground, air, maritime, electronic), tactical organization (including allied forces) and dispositions, doctrine, military capabilities, command and control, personalities including history of key leaders' performance, communications and information systems, current activities and operating patterns, and decision making processes.
NTA 2.4.4.4	Evaluate the Threat	To identify the enemy's likely objectives and prioritized assessment of courses of action available to him. To identify, at a minimum, the enemy's most likely and most dangerous courses of actions.
NTA 2.4.4.5	Determine Enemy Courses of Action	To analyze the environment and the enemy's capabilities and produce the requisite products as an aid to decision making. Intelligence products facilitate the commander's understanding of the battlespace and identify potential opportunities to exploit enemy vulnerabilities.
NTA 2.4.5	Prepare Intelligence Products	To provide as accurate an image of the battlespace and the threat as possible to support both planning and decision making.
NTA 2.4.5.1	Provide Support to the Commander's Estimate	To provide continuing knowledge on current events to update the situation and subsequent intelligence estimates. It is a dynamic process used to assess the current situation and confirm or deny the adoption of specific courses of action by the enemy; it provides the basis for adapting plans to exploit opportunities.
NTA 2.4.5.2	Provide Intelligence to Develop the Situation	To provide early warning of impending hostile action in order to prevent surprise and reduce risk from enemy actions that run counter to planning assumptions. This task includes identifying hostile reactions to US reconnaissance activities and indications of impending terrorist attacks.
NTA 2.4.5.3	Provide Indications and Warning (I&W) of Threat	To identify, locate, and help counter the enemy's intelligence, espionage, sabotage, subversion, and terrorist related activities, capabilities, and intentions in order to deny the enemy the opportunity to take actions against friendly forces. It also includes intelligence support to
NTA 2.4.5.4	Provide Intelligence Support to Force Protection	identify friendly vulnerabilities, evaluate security measures, and assist with the implementation of appropriate security plans and countermeasures.
NTA 2.4.5.5	Provide Intelligence Support to Targeting	To identify enemy target systems, critical nodes, and high-value and high-payoff targets; to provide intelligence to assist target planners in determining the most effective ways to engage these targets. This includes supporting the tactical targeting process.
NTA 2.4.6	Provide Intelligence Support to Combat Assessment	To provide intelligence support to the combat assessment process. This includes BDA, assistance with munitions effects assessment, and re-attack recommendations. BDA estimates physical damage to a particular target, functional damage to that target, and the capability of the entire targeted system to continue its operation.
NTA 2.5	Disseminate and Integrate Intelligence	To provide intelligence to all supported commanders in a timely way and in an appropriate form using any suitable means, while protecting that intelligence from unauthorized disclosure. This task includes ensuring the commanders understand the

		intelligence.
NTA 2.5.1	Determine the Form to be Used in Disseminating Intelligence	To select from the various types of oral, text, and graphics intelligence forms (diagrams, imagery, overlays, standardized single or all-source intelligence reports, briefings, hard and electronic formats, etc.) that best satisfy the supported commander's time requirements and ease of use requirements.
NTA 2.5.2	Establish Secure and Rapid Dissemination Means	To establish flexible and responsive procedures (both *supply-push* and *demand-pull*) and create and maintain both automated and manual communications and information systems for the delivery of intelligence to all supported commanders for both routine and time-sensitive situations.
NTA 2.6	Evaluate Intelligence Operations	To determine the effectiveness of intelligence operations and to make any necessary changes to improve future intelligence operations. The primary task is to determine if disseminated intelligence satisfied all supported commanders' intelligence requirements on time. Additionally, the evaluation provides early identification of new IRs identified by either observed changes in the situation or clarification of the situation provided through on-going intelligence. Finally, it provides guidance and feedback regarding the effectiveness of intelligence operations to support future planning and decision-making needs.
NTA 3	EMPLOY FIREPOWER	To apply firepower against air, ground, and sea targets. The collective and coordinated use of target acquisition data, direct and indirect fire weapons, armed aircraft of all types, and other lethal and nonlethal means against air, ground, and sea targets. This task includes artillery, mortar, and other non-line-of-sight fires, naval gunfire, close air support, and electronic attack. It includes strike, air/surface/undersea warfare, naval surface fire support, counter air, and interdiction.
NTA 3.1	Process Targets	To positively identify and select land, sea, and air targets that decisively impact battles and engagements and match targets with appropriate firepower systems, taking into account operational requirements and capabilities, the rules of engagement, and laws of armed conflict. The term target is used in its broadest sense to include targets in military operations other than war.
NTA 3.1.1	Request Attack	To request the employment of combat systems to deliver ordnance on specific targets or enemy positions.
NTA 3.1.2	Select Target to Attack	To analyze each target to determine if and when it should be attacked. This task includes: define target selection criteria, review the rules of engagement and the laws of armed conflict, compare sensor data to target selection criteria, perform target duplication checks, issue warning orders, determine target location, determine moving target intercept points, fuse target build-up reports to create a list of targets (target list), perform target list maintenance, and choose targets.
NTA 3.1.3	Select Platform(s) and System(s) for Attack	To determine the appropriate attack system (lethal and/or non-lethal) for a particular air, ground, or sea target. This task includes determining the availability of attack platform(s) and system(s) that can provide the required effects.

NTA 3.1.4	Develop Order to Fire	To create firing instructions (such as selected target, required effects, and time on target) for transmission to the selected attack platform(s) and system(s). This task may include conducting tactical fire control, issuing fire commands, issuing an air tasking order (ATO), or task force air and water space plan (e.g., no attack (NOTACK) area).
NTA 3.1.5	Conduct Tactical Combat Assessment	To determine the overall effectiveness of weapons employment during military operations. Combat assessment is composed of three major components: (a) battle damage assessment (BDA), (b) munitions effects assessment, and (c) re-attack recommendations. The objective of combat assessment is to identify recommendations for the course of military operations.
NTA 3.1.6	Develop Countertargeting Plans	Develop plans to prevent the enemy from attaining fire control solutions on own forces. These plans require the integration of assets, timelines, and C2 arrangements.
NTA 3.1.7	Employ Countertargeting	Employ countertargeting tactics when either the tactical situation warrants or when indications and warnings (I&W) indicate an attack is imminent. I&W must permit sufficient time to put countertargeting assets in place.
NTA 3.2	Attack Targets	To engage the enemy and destroy, degrade, or disable targets using all available organic firepower. This task includes all lethal and nonlethal offensive and defensive actions.
NTA 3.2.1	Attack Enemy Maritime Targets	To attack sea targets with the intent to degrade the ability of enemy forces to conduct coordinated operations and/or perform critical tasks. This task includes all efforts taken to control the battlespace by warfare commanders, including strikes against high payoff and high value targets, such as missile launching ships and submarines, and other strike and power projection units throughout the theater. This task includes also those efforts taken to undermine the enemy's will to fight.
NTA 3.2.1.1	Attack Surface Targets	To attack surface targets at sea. Attacks may be conducted with various types of weapons such as naval or other gunfire, cruise missiles or other missile systems, torpedoes, air dropped or air launched weapons, sea mines, or other weapon systems.
NTA 3.2.1.2	Attack Submerged Targets	To attack submerged targets. Attacks may be conducted with various types of weapons such as torpedoes (air, surface, or submarine launched), depth bombs or other dropped explosive devices, sea mines, or other weapon systems.
NTA 3.2.2	Attack Enemy Land Targets	To attack land targets with the intent to degrade the ability of enemy forces to conduct coordinated operations and/or perform critical tasks. This task includes all efforts taken to control the battlespace by warfare commanders, strikes against high payoff and high value targets such as C4I facilities/nodes and ammunition storage facilities throughout the theater, and efforts undertaken to undermine the enemy's will to fight, including interdiction efforts.
NTA 3.2.3	Attack Enemy Aircraft and Missiles (Offensive Counter Air) --	To integrate and synchronize attacks on enemy air capabilities throughout the engagement envelops of organic systems. This task seeks to establish control of the airspace and then to allow all friendly forces to exploit this advantage.
NTA 3.2.4	Suppress Enemy Air Defenses (SEAD)	To coordinate, integrate, and synchronize attacks, which neutralize, destroy, or temporarily degrade enemy air defenses by destructive and/or disruptive means.

NTA 3.2.5	Conduct Electronic Attack	To employ electromagnetic or directed energy to attack personnel, facilities, or equipment to degrade, neutralize, or destroy enemy combat capability. This task includes actions taken to prevent or reduce the enemy's effective use of the electromagnetic spectrum, such as jamming, and anti-radiation missiles, misinformation, intrusion, and meaconing.
NTA 3.2.5.1	Conduct Command and Control (C2) Attack	To prevent effective C2 of adversary forces by denying information through influencing, degrading, or destroying the adversary C2 system.
NTA 3.2.6	Interdict Enemy Operational Forces/Targets	To apply air, ground, and sea-based weapon systems to disrupt, divert, delay, destroy, suppress, or neutralize enemy military equipment and potential including aircraft on the ground, ships in port, material, personnel, fortifications, infrastructure, and command and control facilities before they can be effectively brought to bear against friendly forces.
NTA 3.2.7	Intercept, Engage, and Neutralize Enemy Aircraft and Missile	To intercept, engage, neutralize, or destroy enemy aircraft and missiles in flight. Includes disruption of the enemy's theater missile (ballistic missiles, air-to-surface missiles, and air, land and sea-launched cruise missiles) operations through an appropriate mix of mutually supportive passive missile defense, active missile defense, attack operations, combat air patrol (CAP), and supporting C4I measures.
	Targets (Defensive Counter Air)	To employ lethal fires against hostile targets which are in close proximity to friendly forces to assist land and amphibious forces to maneuver and control territory, populations, and key waters. Fire support can include the use of close air support (CAS) (by both fixed- and rotary-wing aircraft), naval surface fire support (NSFS), land-based fire and special operations forces (SOF).
NTA 3.2.8	Conduct Fire Support	To organize fire support assets to provide fire support for operations. This includes the assignment of direct and general support missions to NSFS; direct support, general support, and general support reinforcing missions to artillery. This task also provides air apportionment and allocation functions.
NTA 3.2.8.1	Organize Fire Support Assets	To illuminate targets to aid in target identification and designation and aid in controlling the guidance system of friendly ordnance.
NTA 3.2.8.2	Illuminate/Designate Targets	To employ lethal fires against hostile targets. This task includes providing target locations, providing target descriptions, and specifying methods of fire.
NTA 3.2.8.3	Engage Targets	To verify impact point of ordnance on selected targets and determine and recommend adjustments to the firing units to increase accuracy.
NTA 3.2.8.4	Adjust Fires	To employ means designed to impair the performance of enemy personnel and equipment. This task includes employing incapacitating agents, deceptive maneuvers, battlefield psychological activities, electronic attack against enemy systems (jamming and use of electromagnetic or directed energy weapons), and countering target acquisition systems.
NTA 3.2.9	Conduct Non-lethal Engagement	To employ means designed to impair the performance of enemy personnel and equipment. This task includes employing incapacitating agents, deceptive maneuvers, battlefield psychological activities, electronic attack against enemy systems (jamming and use of electromagnetic or directed energy

		weapons), and countering target acquisition systems.
NTA 3.2.10	Integrate Tactical Fires	To combine and coordinate all fires and non-lethal means, maximizing their effects in accomplishing the mission and minimizing their effects on friendly/neutral forces and noncombatants.
NTA 3.2.11	Conduct Computer Network Attacks	To disrupt, deny, degrade, or destroy information resident in computers and computer networks or the computers and networks themselves.
NTA 3.3	Conduct Coordinated Special Weapons Attacks	To combine tactical forces into cohesive NCA-directed special weapons attacks. Includes preparedness to employ strategic deterrence forces.
NTA 4	PERFORM LOGISTICS AND COMBAT SERVICE SUPPORT	To sustain forces in the combat zone by arming, fueling, fixing equipment, moving, supplying, manning, maintaining visibility over, and by providing personnel and health services. Includes logistic support, as necessary, to U.S. agencies and friendly nations or groups.
NTA 4.1	Arm	To provide munitions to weapon systems. This includes bombs, mines, missiles, torpedoes, demolition munitions, artillery projectiles, and any other type of conventional ordnance.
NTA 4.1.1	Schedule/Coordinate Armament of Task Force	To schedule and coordinate armament and rearmament of naval/amphibious/land forces to ensure provision of continued support to forces operating both at sea and ashore. This task includes replenishment-at-sea (underway replenishment (UNREP)) from sea- and shore-based assets in addition to replenishment of the forces operating ashore from sea and shore-based assets.
NTA 4.1.2	Provide Munitions Management	To project and allocate available munitions stocks in accordance with combat priorities to weight the main effort.
NTA 4.1.3	Provide Munitions, Pyrotechnics, and Specialty Items ----------	To supply munitions items such as small arms ammunition, grenades, mines, rockets, missiles, bombs, torpedoes, countermeasures, and naval gun, tank, and artillery rounds.
NTA 4.1.4	Maintain Explosives Safety	To determine and coordinate proper and compatible stowage and explosive quantity distance arc requirements from arrival in theater to end user for all explosives and ammunition.
NTA 4.1.5	Onload and/or Offload Ordnance	Receive, inspect, and load ordnance into magazines and/or onto weapon delivery systems. This includes performing weapons systems checks and procedural checklists and using ordnance test, handling and movement equipment. This task also includes download and reload functions.
NTA 4.2	Fuel	To provide fuel and petroleum products (petroleum, oils, and lubricants) to ships, aircraft, weapon systems, and other equipment.
NTA 4.2.1	Conduct Fuel Management	To monitor and forecast fuel requirements. To manage the distribution of petroleum products based on forecasted unit requirements and availability.

NTA 4.2.1.1	Schedule/Coordinate Refueling	To schedule and conduct fueling and replenishment of naval/amphibious/ land forces to ensure provision of continued support to forces operating at sea and ashore. Includes UNREP from sea and shore-based assets in addition to replenishment of the forces operating ashore from sea- and shore-based assets. Also includes amphibious assault bulk fuel system (AABFS), offshore petroleum distribution system (OPDS), and bulk offload of fuel to barrels/bladders from shipping.
NTA 4.2.1.2	Conduct Aerial Refueling	To schedule and conduct air-to-air refueling with refueling tanker aircraft. To control and coordinate distribution of fuel from and to aircraft while airborne. This includes monitoring fuel requirements and managing the distribution of airborne fuel products based on unit requirements and availability during mission execution.
NTA 4.2.2	Move Bulk Fuel	To move bulk fuels by tankers, rail tank cars, hose lines, or bulk transporters to using or refueling units. This includes forward arming and refueling points (FARPs).
NTA 4.2.3	Provide Packaged Petroleum Products	To provide packaged products including lubricants, greases, hydraulic fluids, compressed gases, and specialty items that are stored, transported, and issued in containers with a capacity of 55 gallons or less.
NTA 4.3	Repair/Maintain Equipment	To preserve, repair, and ensure continued operation and effectiveness of units (ships, aircraft, ground forces, weapons systems, and their equipment). It includes the policy and organization related to the maintenance of equipment (afloat and ashore); development of maintenance strategies; standards of performance for both preventive and corrective maintenance; technical engineering support; provision of repair parts and end items; and battle damage repair.
NTA 4.3.1	Schedule/ Coordinate Task Force Repair Assets	To schedule and coordinate the repair and maintenance assets of naval/amphibious forces.
NTA 4.3.2	Repair, Maintain, and Modify Equipment	To repair, maintain, and modify naval forces; to ensure continued support to forces operating ashore during the repair process; and to ensure coordination of the internal task force repair, maintenance, and modification assets. This function includes the provision of repair parts and end items at the right place and right time and all the actions taken before, during, and after battle to keep equipment operational. It also includes employment of depot level maintenance, dry-docking, and deployable repair capabilities such as a tender, battle group intermediate maintenance activity (IMA) or amphibious ready group IMA.
NTA 4.3.2.1	Perform Preventive Maintenance	To conduct maintenance checks and services to quickly identify potential problems. Preventive maintenance includes quick turnaround repairs by component replacement, minor repairs, performance of scheduled services, and calibration.
NTA 4.3.2.2	Diagnose and Repair	To monitor equipment and material performance through the use of on-board sensors, diagnostic equipment, and visual inspections in order to identify impending and/or actual malfunctions. This task includes trend analysis and efforts taken to restore an item to serviceable condition through correction of a specific failure or unserviceable condition.

NTA 4.3.2.3	Perform Quality Assurance (QA)	To ensure repairs are performed in accordance with directives and that the repaired equipment is safe for operation. This task provides qualified inspectors and data analysts to support the maintenance effort.
NTA 4.3.2.4	Perform Fleet Modernization	To upgrade existing systems or add new equipment, subsystems, or other components to improve the level of performance, reliability, or safety. This includes ship alterations (SHIPALTs), ordnance alterations (ORDALTs), engineering changes, and other changes, improvements, or alterations.
NTA 4.3.2.5	Provide Battle Damage Repair to Ships at Sea	To provide off-ship firefighting, underwater and on board damage assessment, structural analysis, and repairs. This task also includes emergency towing for damaged ships and vessels in the combat zone.
NTA 4.3.3	Provide Repair Parts (Class IX)	To provide any part, subassembly, assembly, or component required for installation in the preventive or corrective maintenance of an end item, subassembly, or component. Includes repair parts management (handling, stocking level, storage, and inventory control).
NTA 4.3.3.1	Substitute	To provide suitable replacement parts from the logistics supply system in place of those routinely provided but currently not available. It includes the removal of serviceable parts, components, and assemblies from unserviceable or not economically repairable equipment (materiel authorized for disposal). It also includes the immediate reuse of these parts in restoring a like item of equipment to a combat-operable or serviceable condition.
NTA 4.3.3.2	Exchange and Return	To issue serviceable materiel in exchange for unserviceable materiel on an item-for-item basis. It also includes the turnaround of equipment to the battle or supply system.
NTA 4.4	Provide Personnel and Personnel Support	To provide support to units and individual Service members, as well as providing units with trained, healthy, fit personnel. This task includes civilian and contract personnel.
NTA 4.4.1	Distribute Support and Personnel	To provide support and replacements to military units.
NTA 4.4.1.1	Provide Personnel Readiness Management	To distribute personnel to subordinate commands based on documented manpower requirements or authorizations to maximize mission preparedness. To provide for reception, staging, onward movement, and integration (RSOI) of military and civilian personnel. This includes replacements and return-to-duty personnel.
NTA 4.4.1.2	Provide Personnel Accounting and Strength Reporting	To record by-name data on personnel when they arrive in and depart from units, when their duty status changes, and when their grade changes.
NTA 4.4.1.3	Provide Replacement Management	The physical reception, accounting, processing, support, and delivery of military and civilian personnel. This includes replacements and return-to-duty personnel.
NTA 4.4.1.4	Perform Casualty Operations and Mortuary Affairs	To record, report, verify, and process casualty information and provide for the necessary care and disposition of deceased personnel and their personal property.

	Management	To make personal notification of a casualty, provide circumstances of an incident, and keep the next of kin (NOK) informed of search efforts on those members reported in a missing status. To inquire of the needs of the family and extend assistance. To perform administrative tasks in support of a casualty including contacting the Navy-Marine Corps Relief Society, American Red Cross or other service organizations, assist in arrangement of funeral or memorial services, and offer assistance in completion of survivor benefits applications. Also includes assisting in transportation requirements, dependent escort, and monitoring shipment progress of household goods and personal effects.
NTA 4.4.1.5	Execute Casualty Assistance Calls Program	To perform logistic service tasks for units in the theater, to include clothing exchange and shower/bath, mail, laundry, food, and sanitary services.
NTA 4.4.2	Perform Fleet/Field Services	To provide short and long-term housing for military and associated civilian support personnel. Includes billeting/berthing management and services (cleaning, etc.).
NTA 4.4.2.1	Provide Billeting/Berthing and Related Services	To furnish meals for personnel.
NTA 4.4.2.2	Provide Food Services	To provide goods and services at a savings to military personnel and their families. Ships' stores provide personal necessities as well as laundry, dry cleaning, and barber facilities.
NTA 4.4.2.3	Provide Exchange Services	To support forces with personnel administration, financial, and resource management services; religious ministry support activities; and public affairs and legal services.
NTA 4.4.2.4	Provide Billeting to Noncombatant Evacuees	To use available military resources (including afloat and ashore) to provide accommodations, food and emergency supplies to U.S. dependents, U.S. Government civilian employees, and private citizens (U.S. and third nation) who have been evacuated from the area of operations.
NTA 4.4.3	Perform Personnel Administrative Service Support	To support forces with personnel administration, financial, and resource management services; religious ministry support activities; and public affairs and legal services.
NTA 4.4.3.1	Provide Career and Other Personnel and Administrative Services	To attract and retain the numbers of quality personnel needed to meet manpower requirements. To maintain an effective fighting force by recognizing personnel achievements and promoting qualified personnel. This task includes awards programs, reenlistment and continuation incentive programs, and a career information and counseling program.
NTA 4.4.3.2	Conduct Postal Operations	To provide a network to process mail (including e-mail) and provide postal services.
NTA 4.4.3.3	Provide Morale, Welfare, and Recreation Activities	To provide personnel with recreational and fitness activities and goods and services.
NTA 4.4.3.4	Provide Band Support	To provide music to enhance unit cohesion and the morale of naval personnel; to support civil-military operations, multinational operations, recruiting operations, and national and international community relations operations; and to support

		civil affairs and psychological operations.
NTA 4.4.4	Perform Financial Services	To perform financial services for military personnel, civilians, and foreign nationals. These services include commercial accounting, pay disbursement, accounting, travel pay, and financial technical advice and guidance.
NTA 4.4.5	Provide Religious, Spiritual, Moral, and Morale Support	To advise the commander on matters of religion, moral, and morale concerns. To provide religious support and provide religious program personnel both ashore and afloat. To evaluate and assist command religious programs under the commander's authority.
NTA 4.5	Provide Transport Services	To distribute logistic support in the form of material, support services, and personnel to military units and others by employing transportation services. To move materiel or personnel by towing, self-propulsion, or carrier via any means, such as railways, highways, waterways, pipelines, oceans, Logistics over-the-shore (LOTS), Joint LOTS (JLOTS), and airways. This task includes technical operations and moving and evacuating cargo, personnel, and equipment. At aerial and seaports of debarkation, responsibilities of transportation support include off-load, operational control of the ports and beaches, and management of the throughput.
NTA 4.5.1	Load/Off-Load, Transport, and Store Material	To provide mobile, long-term prepositioning and short-term deployment/ redeployment of unit equipment and supplies in support of designated elements. Includes afloat pre-positioning shipping (APS) for land forces and expeditionary pre-positioning shipping (maritime pre-positioning forces (MPF)) for expeditionary forces and forces to offload that shipping (e. g., cargo handling (CH) battalion). To provide strategic sealift in support of the rapid deployment of heavy mechanized combat units, for movement of an aviation IMA to a contingency area to support a designated mix of fixed-wing, tilt-rotor, and helicopter aircraft in an expeditionary environment, and to provide crane ships or other services to discharge cargo in less developed or war damaged ports on a worldwide basis. Includes management of the inventory.
NTA 4.5.2	Provide or Contract for Shipping	To provide government owned or contracted vessels for transportation services. Includes providing worldwide capabilities of shipping dry cargo (general break bulk or containerized), fluids of various nature and type, and refrigerated or frozen goods. To provide worldwide coverage in point-to-point ocean transport services (i.e., ocean transport tankers, dry cargo common user ocean transport ships). Task includes providing ice-strengthened shipping, roll-on/roll-off (RO/RO) ships, and barges
NTA 4.5.3	Provide Position Reports for in Transit Visibility	(including for lighter aboard ship (LASH)/Navy construction engineers (SEABEEs)) when required. Task also includes planning and provisioning for fast surge capacity for large volume of military equipment and the overall management and prioritization of lift.

NTA 4.5.4	Transport Personnel and Cargo	To maintain timely and accurate status of cargo/passenger movement.
NTA 4.5.4.1	Transport Personnel	To provide the means for and to transport personnel and/or cargo.
NTA 4.5.4.2	Transport Cargo	To provide the means and to transport personnel.
NTA 4.5.5	Provide Materials Handling Equipment (MHE)/ Weight Handling Equipment (WHE)	To provide the means for and to transport cargo.
NTA 4.5.6	Construct, Maintain, and Operate Logistics Over-the-Shore ---- --	To provide specialized mechanical devices to assist in rapid handling (offloading aircraft, landing craft, and shipping, and uploading to other means of transportation or storage) of supplies, materiel, and equipment. This task includes providing qualified personnel to operate MHE/WHE.
NTA 4.6	Supply the Force	To provide means to transport material from vessels in stream to the shore when other means are unavailable (i.e., lack of port facilities). To construct, maintain, and operate LOTS and JLOTS facilities to provide for movement of equipment, personnel, and supplies from amphibious and follow-on echelon shipping in the absence of established port facilities. This task is accomplished through the erection of elevated causeway sections (ELCAS), lighterage for ship-to-shore transport, and the emplacement of AABFS and OPDS.
NTA 4.6.1	Provide General Supply Support	To receive, store, issue, and resupply materiel for military units and others. Includes contracting, receipt, storage, inventory control, and issuance of end items, repairable and consumable materiel, and management of retrograde both at sea and ashore.
NTA 4.6.2	Manage Supplies	To supply Class I (subsistence), Class II (clothing, individual equipment, tools), Class IV (barrier and construction material), and Class VII (major end items).
NTA 4.6.2.1	Provide Preparation, Preservation, and Packaging (PP&P) of	To provide all required supplies when and where the user needs them. To include requesting, procuring, receiving, storing, and issuing supplies.
	Supplies and Equipment	To provide the means to safeguard supplies and equipment in transit and to facilitate their handling and storage.
NTA 4.6.3	Provide Underway Replenishment (UNREP)	To conduct underway replenishment in support of operating forces by providing refrigerated stores, dry provisions, repair/spare parts, general stores, fleet freight, mail, personnel, petroleum, oils, and lubricants (POL), ammunition, and other items to all classes of afloat units.
NTA 4.6.4	Provide Inport Replenishment	To conduct replenishment inport in support of operating forces by providing refrigerated stores, dry provisions, repair/spare parts, general stores, fleet freight, mail, personnel, POL, ammunition, and other items to all classes of afloat units.
NTA 4.6.5	Provide Vertical Replenishment	To conduct vertical replenishment in support of operating forces by providing refrigerated stores, dry provisions, spares, general stores, fleet freight, mail, personnel, ammunition, and other items with helicopters.
NTA 4.6.6	Provide Air Delivery	The delivery and unloading of personnel or materiel from aircraft in flight.

NTA 4.6.7	Provide COD/VOD Delivery	Provide for the delivery of personnel and repair parts to fleet units via COD and VOD assets.
NTA 4.7	Perform Civil Military Engineering Support	To repair and construct facilities and lines of communication, and to provide water, utilities, and other related infrastructure.
NTA 4.7.1	Perform Construction Engineer Services	To construct or renovate temporary and/or permanent facilities (well drilling, water purification and distribution systems, pipeline installation). This task includes constructing marshaling, distribution, and water purification and storage facilities. Task also includes constructing pipelines, constructing/renovating fixed facilities, drilling wells for water, and dismantling fortifications.
NTA 4.7.2	Provide or Obtain Engineer Construction Material	To acquire or obtain material needed to construct or repair facilities or lines of communication.
NTA 4.7.3	Perform Rear Area Restoration	To repair rear area facilities damaged by combat (clear rubble, restore electrical power), natural disaster, or other causes.
NTA 4.7.4	Conduct Port Operations	To organize and supervise port operations to support build up of forces ashore. This will include port loading, port safety, ships' scheduling, establishing navigation aids/vessel traffic systems, and dredging for safe navigation.
NTA 4.7.5	Perform Lines of Communication (LOC) Sustainment ----------	To maintain land, water, and air routes that connect an operating military force with one or more bases of operations and along which supplies and reinforcements move. Task includes constructing/maintaining roads, highways, over-the-shore facilities, ports, railroad facilities, and repairing/expanding existing airfield facilities. Task also includes raising and removing grounded or sunken vessels and providing towing services for ships with propulsion system casualties or non-self propelled craft.
NTA 4.7.6	Supply Electric Power	To supply electric power generation and distribution to military units through fixed or mobile generation, and/or a tactical distribution grid system.
NTA 4.7.7	Provide Water	To produce, purify, store, and distribute water to the force.
NTA 4.7.8	Provide Humanitarian Support	To provide engineering and construction support and repair for Humanitarian Assistance to include repair of local facilities (buildings, bridges, roads, electrical distribution systems, water distribution and purification systems, sewage removal, etc.), and distribution of relief supplies.
NTA 4.7.9	Provide Environmental Disaster Relief Support	To provide support for environmental disaster relief, to include identification and location of hazardous environment, securing potential environmental hazards. Environmental hazards may include oil, hazardous materials, biological, or radiological substances. Task includes the transport and deployment of clean-up materials, hazard control/clean-up of hazardous releases, decontamination, and worker health safety. It also includes providing messing, berthing, and hotel services for other agency workers, and providing command and control facilities. In addition, the task covers the management of environmental hazards and, if required, the transport and evacuation of personnel. This task prevents or minimizes enemy

		environmental exploitation.
NTA 4.7.10	Provide Environmental Remediation (Hazardous Waste Clean -Up)	To provide environmental engineering and remediation (hazardous waste clean-up) for in-theater real estate used by U.S. forces.
NTA 4.8	Conduct Civil Affairs in Area	To conduct those activities that embrace the relationship between the military forces and civil authorities/people in a friendly country or area or in an occupied country or area when military forces are present.
NTA 4.8.1	Support Peace Operations	To provide logistics, medical, and other services to mixed populations in support of disaster relief, humanitarian assistance, and civil action programs.
NTA 4.8.2	Provide Staff Support	To advise the commander on matters relating to the state of morale and welfare including health, sanitation, and medical readiness.
NTA 4.8.3	Provide Interagency Coordination	To coordinate all civil affairs with the appropriate U.S. agencies and follow their direction as appropriate.
NTA 4.8.4	Coordinate With Nongovernmental Organizations	To coordinate civil affairs with appropriate NGOs, including private voluntary organizations (PVOs).
NTA 4.9	Train Forces and Personnel	To prepare Marines, Sailors, civilians, and individual units to fight, operate, and win at the tactical level of war. This task includes advising and training forces of friendly nations and groups.
NTA 4.9.1	Conduct Mission Area Training	To provide training in command and control, weapons employment, mobility (navigation, seamanship, damage control, engineering, and flight operations), and warfare specialty through adequate preparation, effective presentation, and practice to individual watch stations, watch teams, details, parties, and training teams.
NTA 4.9.2	Assess Training	To conduct the evaluation of the performance of individual watch stations and personnel, watch teams, details, parties, and the effectiveness of training teams measured against specified tactical and training standards. This task, conducted by the combatant commanders, shipboard training teams, and afloat training organizations, includes after-action reviews, type commander directed readiness reviews, and organizational assessments. It provides feedback for altering policy and identifying training trends.

NTA 4.9.3	Develop Training Plans and Programs	To prepare unit and individual training plans and programs including developing unit METL, scheduling training, and providing for assessment of training performance and effectiveness. To analyze applicable tasks in plans and external directives and select for training those tasks which are essential to accomplish the unit's missions in wartime and military operations short of war. To select tasks and to establish supporting standards and conditions for each task in the METL for collective, individual, and leader training.
NTA 4.9.4	Provide/Execute Training for US and Other Nation Units and Individuals	To provide adequate preparation, effective presentation, practice and rehearsal, thorough evaluation, and certification of the execution of unit (collective) and individual tasks
NTA 4.9.5	Provide Mobile Training Teams (MTTs)	To provide instruction to U.S. and non-U.S. units using approved programs of instruction concerning weapons, equipment, basic skills, limited maintenance training, and other organic capabilities including appropriate operational training.
NTA 4.9.6	Provide Training Services	To provide units and resources to support training. Research Development, Test and Evaluation (RDT&E), and Tactical Development and Evaluation (TAC D&E) tests and trials.
NTA 4.10	Perform Resource Management	To perform resource management of personnel, equipment, and funds. This includes services such as planning, programming, budgeting, and execution support; budget analysis; and force budget, financial, and management support for commanders. Additional activities include those such as contracting and monitoring contract performance, real property repair and maintenance, equipment systems acquisition, recruiting, providing and accounting for all classes of supply, total asset visibility and budgeting.
NTA 4.10.1	Provide for Real Estate Management	To coordinate the use, lease or purchase of real assets in support of naval forces and other agencies afloat and ashore.
NTA 4.10.2	Manage Contracts and Contract Personnel	To ensure contracts provide for mission requirements. This task requires inclusion of support contractors in sustainment planning. It also includes monitoring contract performance. This task includes properly adjusting required deliverables in light of requirements and allowable scope of effort. It also includes providing required Department of Defense (DOD) support to include support to individual contractor personnel.
NTA 4.10.3	Coordinate Base and Station Activities	To ensure performance of naval base and station actions to support fleet and other commands and units.
NTA 4.11	Provide Operational Legal Advice	To deliver legal services by providing legal advice and assistance on all operational matters concerning military, domestic, foreign, and international law; and rules of engagement.
NTA 4.11.1	Provide Command Legal Service Support	To provide advice and assistance in the functional areas of the law, including administrative, contract, international, and operational law, as well as claims, legal assistance, and military justice.
NTA 4.11.2	Interpret Administrative/ Contract Law -	To review facts; interpret applicable statutes, laws, and directives; and provide legal advice tailored to the command mission on administrative law and contract law matters.

NTA 4.11.3	Administer Criminal Law	To provide legal advice to commanders regarding the administration of military justice. Task includes providing advice on disposition of offenses, the preparation of charges, and conduct of courts-martial. The administration of criminal law also includes defense and judicial requirements.
NTA 4.11.4	Process Claims	To investigate and adjudicate all claims against the United States arising under domestic laws and reciprocal international agreements. To assert affirmative claims on behalf of the United States.
NTA 4.11.5	Provide Legal Assistance	To execute all legal assistance matters, including those associated with preparation for overseas movement (POM). To implement the commander's preventive law program and establish a system for the delivery of legal assistance.
NTA 4.11.6	Interpret International/ Operational Law	To provide timely and accurate advice to commanders in an international environment. To provide legal support for operational law activities, especially law of war and civil affairs legal issues. To provide advice regarding existing rules of engagement and recommended changes.
NTA 4.11.7	Provide Military Courts	To establish and maintain military courts, as required, to maintain order and administer justice over own forces and over all personnel subject to military authority.
NTA 4.11.8	Conduct Investigations	To conduct informal or formal investigations for a commander as a result of legal proceedings or in anticipation of such possible proceedings. Coordinate, as required, with other service, national, or allied entities.
NTA 4.12	Provide Health Services	To preserve, promote, improve, conserve, and restore the mental and physical well being of the force and other designated populations. This task includes providing emergency and routine health care to all personnel; advising commanders on the state of health, sanitation and medical readiness of deploying forces on a continual basis; maintaining health and dental records; keeping a current mass casualty plan; training personnel in basic and advanced first aid; maintaining medical intelligence information files; implementing preventive medicine measures; and ensuring combat readiness of health care personnel assigned to various wartime platforms through continuous training.
NTA 4.12.1	Perform Triage	To classify incoming casualties by level of treatment required
NTA 4.12.2	Provide Ambulatory Health Care	To provide routine, acute, and emergent health services to individuals.
NTA 4.12.3	Provide Surgical and Inpatient Care	To provide resuscitative and surgical care and inpatient services.
NTA 4.12.4	Provide Dental Care	To provide routine, acute, and emergent dental services and care to individuals and provide advice and assistance to commanders as required.
NTA 4.12.5	Coordinate Patient Movement	To coordinate the evacuation of the sick and wounded and to obtain consultation and assistance from remote sources.
NTA 4.12.6	Provide Industrial and Environmental Health Services	To implement and monitor occupational and environmental hazard abatement measures. Task includes hazardous material (HAZMAT) management, storage, and disposal.
NTA 4.12.7	Maintain Records	To maintain health and dental records, and other documentation relating to the provision of health care.

NTA 4.12.8	Obtain and Analyze Medical Information --	To review, catalog, and report information obtained in the course of current operations to include communicable diseases, epidemiological data, chemical and biological agents, and other useful information.
NTA 4.12.9	Train Medical and Non-medical Personnel	To provide training in first aid, preventive medicine, and in advanced skills to support medical response to mass causality situations and operation specific threats.
NTA 4.12.10	Provide Health Services in Support of Humanitarian and Civic Assistance	To provide health services to local populace in support of humanitarian assistance, to include disaster relief and civil action programs.
NTA 4.12.11	Provide Medical Staff Support	To advise the commander on matters relating to the state of health, sanitation, and medical readiness.
NTA 4.12.12	Perform Level II/III Medical Support	To provide and support large scale and Level III medical care for forces ashore (to include hospital (T-AH class) ships and embarked fleet surgical teams (FSTs) in amphibious shipping).
NTA 4.13	Conduct Recovery and Salvage	To obtain damaged, discarded, condemned, or abandoned allied or enemy material both ashore and at sea. Includes monitoring and management of recovered material from initial identification to ultimate disposal, disposition, or repair.
NTA 4.13.1	Conduct Debeaching and Towing of Stranded and/or Damaged Vessels	To free stranded vessels and/or tow vessels with propulsion system casualties using ocean tugs, pulling gear, divers, and portable salvage machinery.
NTA 4.13.2	Conduct Debeaching, Harbor Clearance, and Recovery	To clear beaches, piers, and channels of sunken and grounded vessels using tugs, pulling gear, portable salvage machinery, explosives, divers, and heavy lift craft.
NTA 4.13.3	Provide Required Location and Number of Emergency Ship Salvage Material (ESSM) Bases, Contract Barges, Lift Craft, Deep Submergence Vehicles, and Tugs	To provide for emergency ship salvage, object recovery, and harbor clearance. Task includes providing material assets beyond the organic allowances of assigned salvage forces and/or not in Navy inventory and the identification and provision of preposition materials and equipment using Supervisor of Salvage (NAVSEA 00C) centrally managed salvage funds and assets.
NTA 4.13.4	Perform Underwater Object Recovery	To locate and recover items of intelligence value or otherwise useful to the operational commander, using submersibles, remotely operated vehicles, divers, advanced underwater search techniques, and other methods.
NTA 4.13.5	Salvage Sunken, Grounded, and Beached Vessels	To raise or extract ship and craft and return them to use using pulling gear, tugs, divers, heavy lift craft, portable salvage equipment, and other systems.
NTA 4.13.6	Perform Emergency Towing	To tow combatant, logistics force, and other vessels with propulsion system casualties using ocean going tugs or other ships.

NTA 4.13.7	Conduct Salvage of Oil and Fuels Cargo	To offload liquid petroleum products from sunken or grounded ships or barges using lighters, specialized pumps, underwater and surface hot tap tank penetration devices, barges, bladders, and other equipment.
NTA 4.13.8	Salvage Sunken Submarines	To salvage sunken submarines using compressed air, surface support vessels, divers, pontoons, and other equipment.
NTA 4.13.9	Rescue Crew of Sunken Submarines	To rescue crewmen trapped in sunken submarines using submersibles (operating from surface ships or submarines) to attach to the sunken vessel.
NTA 4.14	Provide Support Services	To provide services and units to support research development, test, and evaluation (RDT&E), and tactical development and evaluation (TAC D&E) tests and trials.
NTA 5	EXERCISE COMMAND AND CONTROL	To exercise authority and direction over assigned or attached forces in the accomplishment of a mission. C2 involves maintaining visibility over and arranging personnel, equipment, and facilities during the planning and conducting of military operations.
NTA 5.1	Acquire, Process, and Communicate Information and Maintain Status	To obtain information on the mission, enemy forces, neutral/non-combatants, friendly forces, terrain, and weather. To translate that information into usable form and to retain and disseminate it. This task includes disseminating any type information.
NTA 5.1.1	Communicate Information	To send and receive internal and external data (to include verbal, semaphore, flashing light, signal flag, electronic, written). This activity includes obtaining, relaying, and distributing data and information by any means including establishing communication links with service, joint, interagency, intra-agency, and coalition forces. Information can include the mission, courses of action, air tasking orders, operational plans and orders, intelligence, environmental conditions, friendly troop/unit status and location, relaying I&W information, and other reports.
NTA 5.1.1.1	Transmit and Receive Information	To send and receive information (including tactical commanders assessments) between units and/or higher formations or commands (including the officer in tactical command (OTC) and functional commanders) to build the tactical picture.
NTA 5.1.1.1.1	Provide Internal Communications	To send and receive information required for own unit operations and to provide tactical information through the use of internal communication systems.
NTA 5.1.1.1.2	Provide External Communications	To provide tactical information through the use of external communications systems. This task includes the use of the entire electromagnetic spectrum for voice, tactical data information link (TADIL), teletype (TTY), and other data link communications, and flashing light, semaphore, and flag hoist for visual communications.
NTA 5.1.1.1.2.1	Receive and Transmit Force Orders	To provide and acknowledge tactical directions, including automated combat system data and orders for cover/kill/cease-fire/hold-fire orders. To provide threat warnings and weapons control status.
NTA 5.1.1.1.2.2	Relay Communications	To pass information which cannot reach its targeted audience directly? This includes the use of aircraft for tactical relay.

NTA 5.1.2	Manage Means of Communicating Information	To direct, establish, or control the instruments used in sending or receiving information and to use various communication networks (visual, radio, wire and cable, and messenger) and modes (e.g., frequency modulation (FM), multi-channel, radio teletype (RATT), continuous wave (CW), tactical satellite, data, facsimile) for obtaining or sending information. To operate these nets under various levels of emissions control (EMCON).
NTA 5.1.2.1	Control Communication Nets	To ensure controlled nets (voice and data) carry information appropriate to their function.
NTA 5.1.2.2	Promulgate Force Communication Plan	To pass to all users the communications plans and procedures, to include frequency, purpose, and guard requirements. Communications plans include net parameters, net participants, and what information each net will carry.
NTA 5.1.3	Maintain Information and Naval Force Status	To screen, circulate, store, and display data and information in a form that supports decision making and the tactical picture. To store, protect, display, publish, reproduce, and distribute information to include force organization, casualty reports (CASREP's) and readiness data, and maintain information in tactical decision aids (TDAs).
NTA 5.1.3.1	Maintain and Display Tactical Picture	To process (to include fusing, correlating, and filtering) and maintain (automated and manual) raw data and display image-building information as the tactical picture. This tactical picture forms the primary basis for tactical level situation assessment.
NTA 5.1.3.2	Maintain and Display Force Command and Coordination Status	To track and display task organization, assignments, and execution information to include warfare commander responsibilities.
NTA 5.1.3.3	Maintain and Display Units Readiness	To track and display information on Unit Readiness to include status on all materiel deficiencies and personnel limitations.
NTA 5.2	Analyze and Assess Situation	To evaluate all information received to continuously determine courses of actions.
NTA 5.2.1	Analyze Mission and Current Situation	To examine all available information. This includes analyzing the mission, mission requirements, and evaluating updated status information. In this task, the commander analyzes higher-level guidance, identifies enemy centers of gravity, reviews assessments of the situation, and prepares a mission statement along with the commander's critical information requirements (CCIRs). Initial intent and initial planning guidance are developed and issued to facilitate determining the proposed course(s) of action.
NTA 5.2.1.1	Review and Evaluate Situation	To review the general tactical situation, including available tactical data, intelligence assessments, environmental conditions, and other external information. Includes assessment of own force and enemy capabilities for planning purposes.
NTA 5.2.1.2	Review and Evaluate Mission Guidance	To review the superior commander's mission guidance and intentions including objectives, specified tasks, and implied tasks. To identify constraints or restraints on actions and assumptions, and to relate the guidance to the general tactical situation.

NTA 5.2.1.3	Review Rules of Engagement (ROE)	To determine limitations on tactical action based on Rules Of Engagement (ROE). This also includes understanding the freedom for action provided by ROE.
NTA 5.2.1.4	Request Changes to ROE	To request changes to ROE based on the review of the situation and current ROE.
5.2.1.5	Determine and Prioritize Commander's Critical Information Requirements (CCIR)	To identify and prioritize those items of information, which are critical to the war fighter's decision-making process.
NTA 5.2.2	Decide on Need for Action or Change	To decide whether actions are required that are different from those the unit or organization has already been directed to execute.
NTA 5.3	Determine and Plan Actions and Operations	To make estimates and decisions based on assigned, projected, or implied tasks. To examine all aspects of potential operations, including options to alter planned or ongoing actions, and determine the acceptable degree of risk. It also includes formulating the commander's guidance and intent and developing a mission essential task list including tasks and linked conditions and measures.
NTA 5.3.1	Develop Concept of Operations	To determine how the tactical commander intends to operate and fight his unit.
NTA 5.3.1.1	Define the Mission	To state the mission in the commander's terms.
NTA 5.3.1.2	Provide Concept of Operations	To provide the commander's initial determination of a concept of operations and follow-on adjustments, as necessary, for achieving the mission.
NTA 5.3.1.3	Develop Requirements and Priorities	To establish and validate support requirements, including force logistics requirements and C4I requirements. It includes developing requirements for resources or capabilities (i.e., information, material, services, equipment, and personnel) and requesting additional assets, as the situation requires. Requirements are based upon concept of operations, COA, scheme of maneuver, and status of resources.
NTA 5.3.1.4	Develop Procedures	To establish common reporting and tactical procedures, to include development of communications plan(s).
NTA 5.3.2	Issue Planning Guidance	To provide naval planners with information to develop courses of action. This task includes guidance on the collection of intelligence to support operations and support planning. Commander's guidance may include establishing planning time lines, providing operational limitations or constraints (such as rules of engagement), establishing priorities for planning, and initiating an estimate of the situation. It also includes the development of specified and implied tasks.

NTA 5.3.3	Develop Courses of Action	To define options for completing the mission based on analysis of the mission and a determination of mission feasibility with regard to enemy forces, friendly/neutral forces, non-combatants, and environmental factors. This activity includes evaluating available resources for supporting different courses of actions.
NTA 5.3.4	Analyze and Compare Course of Action	To analyze and evaluate each proposed friendly course of action as though opposed by each enemy capability. To examine or war game each COA to determine its advantages and disadvantages, and to ensure it satisfies the criteria of suitability, feasibility, acceptability, and flexibility. To evaluate the advantages and disadvantages of each COA, comparing them with respect to governing factors.
NTA 5.3.5	Select or Modify Course of Action	To decide on the course of action that offers the best prospect for success and to issue a clear and concise statement of the general scheme of maneuver, supporting fires, and support for the operation. This task includes finalizing the naval commander's concept and intent. It also includes modifying a course of action previously selected and, therefore, is a cyclic process and it includes setting and revising priorities. This task also includes the ability to make real time changes to targeting and strike plans such as changes to cruise missile strike mission plans.
NTA 5.3.6	Prioritize Subordinate Commander Requirements	To resolve asset request conflicts and, in such cases, determine allocation of assets for subordinate commanders.
NTA 5.3.7	Establish Force Command and Control Policy	To specify chain of command between the principle commanders and forces under their tactical control/tactical command; to specify subordinate command relationships. To identify degree of authority delegated to each warfare commander during cold-to-hot and hot-to-cold war transition periods and the areas in which the principle commanders can expect to assume control by command override.
NTA 5.3.8	Issue Tactical Commander's Estimate	To restate force mission and commander's intent; to identify subordinate's objectives, missions, and tasks.
NTA 5.3.9	Prepare Plans/Orders	To complete written or oral communications that convey information that governs actions, including those in selected COAs. It includes developing and completing plans and orders, coordinating support, and approving orders. This task guides, develops, and integrates detailed plans that support the mission. The COA mission requirements and capabilities are considered in the production of the plan. The commander's intent is refined and the operation plan is produced in this task, as well as other supporting plans and documents that integrate resources with maneuver. As the operation progresses, this activity is the decision-maker articulating, by whatever means necessary, his plan for meeting new challenges in the battlespace.
NTA 5.3.9.1	Formulate Standing Plan	To formulate those pre-planned actions that can be included as standing plans and to modify existing plans, as necessary.

NTA 5.3.9.2	Develop Contingent Responses	To formulate immediate responses to threats that can be foreseen or anticipated. This task includes such items as cruise missile mission planning and dissemination.
NTA 5.3.9.3	Plan Tactical Operations	To produce the detailed plan to accomplish the assigned mission, based upon the assessment and the selected course of action. This task includes completing detailed staff planning, integrating staff plans, reviewing staff plans, generating revision requirements, and developing an integrated plan.
NTA 5.3.9.4	Rehearse Operations	To conduct one or more exercises under conditions approximating those of the contemplated operation or mission. Rehearsals may be conducted by the entire force or by individual units; rehearsals may deconflict activities and validate the operation plan.
NTA 5.4	Direct, Lead, and Coordinate Forces	To direct subordinate units so that they understand and contribute effectively and efficiently to the attainment of the commander's concept and intent and assigned tactical military objectives. This task includes preparing and completing plans and orders, intelligence collection plans, essential elements of information, logistic plans, and promulgating rules of engagement.
NTA 5.4.1	Direct Forces	To command and control operations of the task organization and the force.
NTA 5.4.1.1	Issue Orders	To guide and command the execution of the plans. The commander's direction is guided by the operation order derived during the planning of the operation, as well as by the commander's intent, and may be varied as the battlespace situation changes. This task includes submitting orders and plans for transmission to subordinate, supporting, or attached units for execution, to adjacent and higher units for coordination and/or approval, and to promulgate ROE to subordinates.
NTA 5.4.1.2	Exercise Tactical Command and Control	To execute command and control (e.g., order warfare degrees of readiness; direct asset assignment, movement, and employment; control tactical assets, including allied and joint forces assigned).
NTA 5.4.2	Lead Forces	To provide leadership to assigned forces and to those attached.
NTA 5.4.2.1	Maintain Command Presence	To allow the commander to act, either directly or through direct communication, so as to infuse among subordinates the commander's will and intent. In addition to guiding, directing, and controlling operations, a commander must make his personal presence felt through personal positioning, communication, and involvement.
NTA 5.4.2.2	Maintain Unit Discipline	To preserve ordered behavior and obedience within the naval forces even under the severest combat conditions in order to execute the commander's concept and intent.

NTA 5.4.3	Synchronize Tactical Operations and Integrate Maneuver with Firepower	To arrange surface, subsurface, air, and ground forces and coordinate detection assets and tactical fires with the maneuver of forces in time, space, and purpose to support the commander's concept of operations and produce maximum relative combat power of combined arms at the decisive point. The goal is to maximize the effects of fires to accomplish the mission and minimize the effects on friendly/neutral forces and noncombatants. This task includes requests to higher authorities and requests to or support of non-assigned units operating within the area of operations, ships and units of foreign nations not under US command, and coordinating with external agencies and elements.
NTA 5.4.3.1	Coordinate Strike Missions	To provide centralized direction for the allocation and tasking of assigned/ supporting air assets based upon the commander's apportionment decisions and guidance. This task includes the development and promulgation of strike plans, policy, and intentions and, when directed, the coordination of joint air operations.
NTA 5.4.3.2	Develop/Publish Fire Support Measures	To prepare and promulgate fire support measures for deconfliction of friendly naval surface fire support, close air support, strike, artillery and other direct fires with movement of friendly forces. This task includes establishment of fire support control and coordination measures such as free fire, restricted fire, fire support coordination lines, no-fire, coordinated fire lines, restrictive fire lines, and phase lines. It also includes arranging for necessary support assets not organic to the Task Force.
NTA 5.4.3.3	Coordinate Naval Surface Fire Support (NSFS)	To coordinate NSFS with maneuver of forces ashore into a cohesive action maximizing their effect in accomplishing the mission and minimizing adverse effects on friendly/neutral forces and noncombatants.
NTA 5.4.3.4	Coordinate Artillery Support	To coordinate artillery support with maneuver of forces ashore into a cohesive action maximizing their effect in accomplishing the mission and minimizing adverse effects on friendly/neutral forces and non-combatants.
NTA 5.4.3.5	Coordinate Close Air Support	To coordinate close air support (CAS) with maneuver of forces ashore into a cohesive action maximizing their effect in accomplishing the mission and minimizing adverse effects on friendly/neutral forces and non-combatants.
NTA 5.4.3.6	Coordinate Offensive Mining Operations	To coordinate offensive mining operations to neutralize opposition maritime firepower and minimize threat to friendly forces.
NTA 5.4.4	Establish Liaisons	To provide personnel to other units or external agencies to allow for better communication and coordination. This includes providing support and facilities for liaisons assigned to one's own unit.
NTA 5.4.5	Report and Analyze Mission Readiness	To review data and produce routine, periodic, situation, and status reports as well as reporting ability to continue mission following significant tactical events.

NTA 5.5	Conduct Information Warfare (IW)	To integrate the use of operations security (OPSEC), military deception (MILDEC), psychological operations (PSYOP), electronic warfare (EW), computer network operations (CNO), physical destruction, and the related activities of civil affairs (CA) and public affairs (PA), mutually supported by intelligence to deny information and to influence, degrade, or destroy adversary C2 capabilities, and to protect friendly C2 against such actions. Employing IW includes two component activities: (1) prevent or deny enemy effective C2 of adversary forces (also called C2 attack) and (2) maintain effective friendly C2 (also called C2 protect).
NTA 5.5.1	Plan, Integrate, and Employ C2 Attack	To plan actions to prevent effective C2 of adversary forces by denying information through influencing, degrading, or destroying the adversary C2 system.
NTA 5.5.2	Plan, Integrate, and Employ C2 Protect	To plan actions to maintain effective command and control of own forces by turning to friendly advantage (or negating) an adversary's efforts to deny information to friendly forces. It also includes turning to friendly advantage (or negating) an adversary's efforts to influence, degrade, or destroy the friendly C2 system.
NTA 5.5.3	Conduct Psychological Operations	To conduct planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals. This includes: (1) Identifying afloat reproduction and printing capabilities available for development of approved psychological operations (PSYOP) products to include handbills, leaflets, and posters, (2) Identifying delivery capabilities to include air, ordnance, and electronic means, (3) Conducting support to joint PSYOP plans, and (4) Maintaining, deploying, and identifying shortfalls in PSYOP support equipment not available afloat.
NTA 5.5.4	Conduct Electronic Warfare Support (ES)	To obtain signals intelligence (SIGINT) information about the activities of an enemy or potential enemy in the tactical area of operations. This task employs land, sub-surface, airborne, shipboard, and space sensors to complement perishable information obtained by other sources. This task includes providing, either on a time-share or dedicated basis, assets or asset protection to meet the commander's needs in a tactical environment.
NTA 5.5.4.1	Conduct Measurement of Own Force Electronic Emitters	To develop a database of own forces emitters in order to monitor and control own force emissions. This task would entirely depend upon a valid, up-to-date "own force" database, this will significantly minimize inter-force interference, blue on blue attacks (both soft and hard kill) and provide systems analysis to determine signals security deficiencies and recommend appropriate corrective action.
NTA 5.5.4.2	Conduct Electronic Warfare Reprogramming	To reprogram electronic warfare systems and libraries to ensure the continuing life-cycle integrity of EW systems' library data and implement the mechanism for informing commanders of changes in the EW environment and the potential impact of those changes on deployed platform and force protection systems. This task includes effectively countering hostile wartime reserve modes (WARM) and maintaining a vigilant

		intelligence review effort in order to minimize the impact of threat WARM on naval reprogrammable EW systems.
NTA 5.5.5	Perform Information Assurance	To protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. This includes providing for restoration of information systems by incorporating protection, detection and reaction capabilities.
NTA 5.5.5.1	Provide Computer Network Defense	To protect and defend information, computers, and networks from disruption, denial, degradation, or destruction.
NTA 5.5.5.2	Perform Electronic Protection	To protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability.
NTA 5.5.6	Perform Spectrum Management-	To plan, coordinate, manage and control use of the electromagnetic spectrum through operational engineering, administrative and visualization procedures, with the objective of ensuring electronic systems (radar, communications and electronic warfare support equipment) perform their functions in the intended environment without causing or suffering unacceptable interference or degradation.
NTA 5.6	Conduct Acoustic Warfare	Action involving the use of underwater acoustic energy to determine, exploit, reduce, or prevent hostile use of the underwater acoustic spectrum and actions, which retain friendly use of the underwater acoustic spectrum. This task includes acoustic warfare support measures, acoustic warfare countermeasures, and acoustic warfare counter-countermeasures.
NTA 5.7	Establish a Task Force Headquarters	To organize a headquarters for the command and control of designated and organized forces under the duly authorized force commander. This includes developing a command and control structure, a force liaison structure, and effectively integrating force staff augmenters.
NTA 5.7.1	Develop a Force Command And Control Structure	To establish a structure for command and control of subordinate forces, maintain liaison with elements of the force, and integrate augmented personnel.
NTA 5.7.2	Deploy Force Headquarters Advance Element	To deploy elements of the headquarters into the operational area in advance of the remainder of the force. This activity includes collecting and updating information relevant to the pre-deployment site survey.
NTA 5.7.3	Plan and Execute Command Transition	To establish continuous, uninterrupted and unambiguous guidance and direction for command transition; to plan and execute command transition. To ensure possession of adequate C4I capabilities, specific procedures, adequate communications, connectivity, manning, intelligence support, and C2 capability for command transitions.

NTA 5.8	Provide Public Affairs Services	To advise and assist the commander, associated commands, and coalition partners (or host nation in military operations other than war) in providing information to internal and external audiences, by originating (and assisting civilian news media in originating) print and broadcast news material, and assisting with community relations projects. The task includes establishing an information bureau to meet area requirements and includes the coordination of the combat camera group's activities.
NTA 6	PROTECT THE FORCE	To protect the tactical forces fighting potential so that it can be applied at the appropriate time and place. This task includes those measures the force takes to remain viable and functional by protecting itself from the effects of or recovery from enemy activities.
NTA 6.1	Enhance Survivability	To protect personnel, equipment, ships, aircraft, supplies, areas, and installations from enemy and friendly operations and systems and natural occurrences.
NTA 6.1.1	Protect Against Combat Area Hazards	To protect friendly forces in the battle space by reducing or avoiding the effects of enemy weapons systems and sensors and friendly mutual interference or fratricide. This task includes providing safety to personnel, units, and equipment during operations and training (e.g., through positive identification).
NTA 6.1.1.1	Protect Individuals and Systems	To use protective positions, measures, or equipment to reduce the effects of enemy and friendly weapon systems and to enhance force effectiveness. This activity physically protects a military unit, area, activity, or installation against acts designed to impair its effectiveness and to retain the unit's capability to perform its missions and tasks. It includes employing local security, observation posts, and protective positioning of equipment. While moving, forces employ a variety of movement techniques designed to enhance protection (e.g., the use by maritime forces of convoys, circuitous routing, dispersal and defensive formations, and zigzag plans; includes the use by naval aircraft of routing and formations that enhance self-protection, plus individual aircraft junking techniques). The task includes providing for passive defense in a nuclear/biological/chemical (NBC) - chemical/biological/radiological (CBR) environment.
NTA 6.1.1.2	Remove Hazards	To eliminate the presence of hazards to equipment and personnel. This task includes hazardous material removal, decontamination, and explosive ordnance disposal.
NTA 6.1.1.3	Positively Identify Friendly Forces	To provide the means, procedures, and equipment to positively identify friendly forces and distinguish them from unknown, neutral, or enemy forces. This task includes positively distinguishing friendly from enemy forces through various methods that may include procedural, visual, electronic, and acoustic, in addition to providing information to the force commander to aid in the identification of unknown contacts.
NTA 6.1.2	Conduct Perception Management	To convey and/or deny selected information and indicators to foreign audiences to influence their emotions, motives, and objective reasoning. To convey and/or deny selected information and indicators to intelligence systems and leaders at all levels to influence official estimates, ultimately resulting in foreign behaviors and official actions favorable to the originator's

		objectives. In various ways, perception management combines truth projection, operations security, cover and deception, and psychological operations.
NTA 6.1.2.1	Employ Operations Security	To deny adversaries information about friendly capabilities and intentions by identifying, controlling, and protecting indicators associated with planning and conducting naval operations. OPSEC process consists of five distinct actions: identification of critical information, analysis of threat, analysis of vulnerability, assessment of risk and application of appropriate OPSEC measures.
NTA 6.1.2.1.1	Employ Electronic Security	To deny unauthorized persons information of value that might be derived from their interception and study of non-communications electromagnetic radiations, e.g., radar.
NTA 6.1.2.1.2	Employ Concealment Techniques	To protect friendly forces and personnel from observation and surveillance. This task includes the use of maneuver, deceptive lighting, certain emissions control postures, camouflage, physical evidence controls, smoke, and other obscurants.
NTA 6.1.2.1.3	Employ Communications Security	To deny unauthorized persons information derived from telecommunications of the U.S. Government related to national security and to ensure the authenticity of such communications. Such protection results from the application of security measures (including crypto security, transmission security, emissions security, password management and file protection) to telecommunications systems and automated information systems (AIS), which generate, handle, process, store, or use classified or sensitive government or government-derived information, the loss of which could adversely affect the national security interest. It also includes the application of physical security measures to communications security (COMSEC) information or materials.
NTA 6.1.2.2	Conduct Deception In Support of Tactical Operations	To mask the real objectives of tactical operations and delay effective enemy reaction. This is done by misleading the enemy about friendly intentions, capabilities, objectives, and the locations of vulnerable units and facilities. This task includes manipulating, distorting, or falsifying evidence available to the enemy to enhance security of real plans, operations, or activities. It includes counter-targeting and physical and electronic (imitative, simulative, and manipulative) deception.
NTA 6.1.3	Conduct Counterdeception	To negate, neutralize, diminish the effects of (or gain advantage from) a foreign deception operation. (Counterdeception does not include the intelligence function of identifying foreign deception operation.)
NTA 6.1.4	Conduct Counterpropaganda Operations	To conduct activities that identify adversary propaganda and, thereby, contribute to situational awareness and serve to expose adversary attempts to influence friendly populations and military forces.
NTA 6.1.5	Maintain Counterreconnaissance	To protect a military unit, area, activity, or an installation against hostile observation acts.
NTA 6.2	Rescue and Recover	To rescue and recover military and civilian personnel, equipment and systems.

NTA 6.2.1	Evacuate Noncombatants from Area	To use available military and civilian resources (including host-nation resources) to evacuate U.S. dependents, U.S. Government civilian employees, and private citizens (U.S. and third nation) from the area of operations. This task includes providing temporary security augmentation to U.S. Government and U.S. privately owned facilities ashore.
NTA 6.2.2	Conduct Personnel Recovery	To execute Personnel Recovery (PR) operations using component, joint, multinational, and multi-agency Personnel Recovery capabilities to report, locate, support, recover, and debrief and reintegrate U.S. military, Department of Defense (DOD) civilians, contractors, and other designated personnel. At the tactical level, PR includes Search and Rescue (SAR), Combat Search and Rescue (CSAR), and Survival, Escape, Resistance, and Evasion (SERE).
NTA 6.2.2.1	Perform Search and Rescue (SAR)	To employ aircraft, surface ships, submarines, specialized rescue teams, and equipment for search and rescue (SAR) of personnel in distress on land or at sea.
NTA 6.2.2.2	Perform Combat Search and Rescue (CSAR)	To locate and extract personnel from enemy controlled area during wartime or contingency operations. To conduct recovery operations during an in-extremis situation by means of an emergency extraction of hostages and/or sensitive items and expeditiously transport them to a designated safe haven.
NTA 6.2.2.3	Conduct Tactical Recovery of Aircraft and Personnel (TRAP) ---	To conduct and plan the tactical recovery operations of aircraft and personnel (TRAP). To locate and extract distressed personnel and sensitive equipment from enemy controlled area during wartime or contingency operations to prevent capture. TRAP is performed by an assigned and briefed aircrew and is a subcomponent of combat search and rescue (CSAR) and/or joint combat search and rescue (JCSAR) missions, but is only executed once the location of survivors is confirmed. A TRAP mission may include personnel to conduct the search portion of CSAR or the over water portion of search and rescue missions. The composition of a tactical recovery mission may vary from a single aircraft and aircrew to an assault support mission package that consists of multiple fixed-wing and rotary-wing aircraft with an onboard compliment of security, ground search, and medical personnel.
NTA 6.2.2.4	Conduct Submarine Escape and Survival	To use equipment and methods to ensure ability of personnel to escape from a severely damaged submarine and survive until rescued.
NTA 6.3	Provide Security for Operational Forces and Means	To enhance freedom of action by identifying and reducing friendly vulnerability to hostile acts, influence, or surprise. This includes measures to protect from surprise, observation, detection, interference, espionage, terrorism, and sabotage. This task includes actions for protecting and securing the flanks and rear area of operational formations, and protecting and securing critical installations, facilities, and systems. It also includes protection of harbors, ports, and installations against acts, which may undermine the effectiveness of friendly forces.
NTA 6.3.1	Protect and Security Area of Operations	To protect the routes, land, water, and air, which connect an operating military force with a base of operations and along which supplies and military forces move.

NTA 6.3.1.1	Establish and Maintain Rear Area Security	To provide for rear area security including measures taken prior to, during, and/or after an enemy airborne attack, sabotage, infiltration, guerrilla action, and/or initiation of psychological or propaganda warfare to minimize the effects thereof.
NTA 6.3.1.2	Protect/Secure Operationally Critical Installations, Facilities, and Systems	To protect operationally critical installations, facilities, and systems from attack in the operational area.
NTA 6.3.1.3	Provide Harbor Defense and Port Security	To provide naval forces for the protection of vessels and port/waterfront facilities. This task includes protecting friendly forces within a designated geographic area; harbors, approaches, or anchorages against external threats, sabotage, subversive acts, accidents, theft, negligence, civil disturbance, and disasters.
NTA 6.3.1.4	Protect Lines of Communications	To protect the land, water, and air routes which connect an operating military force with a base of operations and along which supplies and military forces move. (
NTA 6.3.1.5	Establish and Enforce Protection Perimeter	To establish a force protection perimeter to include assessment zone, warning zone, threat zone, and the minimum standoff zone.
NTA 6.3.1.6	Conduct Surveillance Detection Operations	To identify, locate, and help counter the enemy's intelligence, espionage, sabotage, subversion, and terrorist-related activities, capabilities, and intentions in order to deny the enemy the opportunity to take actions against friendly forces.
NTA 6.3.1.6.1	Evaluate Base Security Procedures	To conduct audits, inspections, and exercises to determine base security readiness.
NTA 6.3.1.6.2	Operate Low Level Source Networks	To identify, recruit and monitor local personnel who can assist in providing early indication and warnings of potential criminal or hostile activities.
NTA 6.3.2	Conduct Military Law Enforcement Support (Afloat and Ashore)	To enforce military law and order and collect, evacuate, and intern enemy prisoners of war.
NTA 6.3.2.1	Manage Enemy Prisoners of War	To collect, process, evacuate, intern, safeguard, and transfer enemy prisoners of war and civilian internees.
NTA 6.3.2.2	Maintain Law and Order	To enforce laws and regulations and maintain the discipline of units and personnel. This task includes performing counterdrug activities, combating terrorism, and assisting U.S. civil authorities. This task also includes law enforcement, criminal investigation, and military prisoner confinement.
NTA 6.3.2.2.1	Assure Traffic Safety and Security of Routes	To provide safe and secure supply and transportation routes to expedite the movement of resources and to maintain traffic safety. Included in this task are methods to improve and restore traffic safety, direct traffic flows, clear accidents or chokepoints, construct detours and alternate routes, and respond to other traffic and road emergencies.
NTA 6.3.2.2.2	Review and Apply Use of Deadly Force Rules	To determine limitations and authorizations for tactical action based on use of deadly force (UODF). This includes understanding the basis for the rules and the freedom of action provided by UODF.

NTA 6.3.2.2.3	Employ Military Working Dog Assets	Maintain, train, and employ military working dogs (MWDs) for law enforcement and counter-narcotics, counter-explosives and counter-terrorism patrols. This task includes custody and proper handling of required target training aids for dog proficiency.
NTA 6.3.2.3	Manage Refugees and Refugee Camps	To collect, process, evaluate, safeguard, house, and release refugees. This task may include determination of political asylum status.
NTA 6.3.3	Combat Terrorism	To perform defensive and offensive measures to reduce vulnerability of individuals and property to terrorist acts; to prevent, deter, and respond to terrorism.
NTA 6.5	Perform Consequences Management	To employ all consequence management techniques available to restore combat capabilities to units and bases damaged by enemy attack or natural occurrences.
NTA 6.5.1	Provide Disaster Relief	To deliver disaster relief, including personnel and supplies, and provide a mobile, flexible, rapidly responsive medical capability for acute medical and surgical care.
NTA 6.5.2	Coordinate Damage Control Operations	To perform all necessary actions required responding to and fight all shipboard and base fires. Task includes performing all necessary actions required to respond to a casualty, provide casualty control, and make all necessary repairs to minimize and prevent further damage and maintain material conditions of readiness.
NTA 6.5.3	Provide Emergency Assistance	To perform all necessary actions required assisting another unit in responding to an enemy attack or natural occurrence.
NTA 6.6	Provide for Operational Safety of Personnel and Equipment	To eliminate accidents, deaths, and occupational illnesses by applying risk management strategies.

APPENDIX F
INSTRUCTIONAL QUALITY AND USABILITY SUMMARY SHEET

McNeese Game Assessment Tool

Instructional Quality Usability Criteria Summary Sheet

Quality Usability Evaluation		
5. Navigation and Operation	Score (1-5)*	
5.a User Interface makes game structure explicit.		
5.b. Tutorial is available to explain navigation and operation features.		
5.c. Help function is available to explain navigation & operation features.		
5.d. Includes all necessary navigation and operation controls		
5.e. Navigation & operation controls are clearly and consistently labeled.		
5.f. Navigation & operation controls are located in consistent place.		
5.g. Navigation & operation controls function consistently.		
5.h. Game is designed to show user progression.		
Navigation and Operation Subtotal		
6. Content Presentation		
6.a. All media is clear and sharp.		
6.b. Multimodal presentation of content is used.		
6.c. Multimedia presentation of content is use.		
6.d. Media are easy to use.		
Presentation Subtotal		
7. Installation and Registration		
7.a. Game does not require installation or user can install the game without assistance.		
7.b. Minimal plug-ins are required.		
7.c Technical support is available.		
7.d. Registration is simple and straightforward (or not required).		
Installation and Registration Subtotal		
Instructional Quality Usability Subtotal		
Instructional Gaming Features Subtotal		
Total Quality Score		

APPENDIX G
INSTRUCTIONAL GAMING FEATURES EVALUATION SUMMARY SHEET

McNeese Game Assessment Tool

Evaluation Summary Sheet

Instructional Gaming Features Evaluation		
1. Instructional Content	Score (1-5)*	
1.a. The content is presented in a logical manner.		
1.b. The purpose of the game is clearly stated.		
1.c. The instructional objectives are clearly stated.		
1.d. The content supports military instructional objectives.		
1.e. The content is realistic and free from technical errors.		
1.f. Then content is job relevant.		
1.g. The instructional rules are clearly stated.		
1.h. There are clear indications of prerequisite game levels.		
Content Subtotal		
2. Instructional Activities		
2.a. Activities are relevant (all support military objectives).		
2.b. The learner is required to interact with content.		
2.c. Instruction is engaging (attracts and maintains learners' attention).		
2.d. Instructional media directly support learning activities.		
Activities Subtotal		
3. Performance Assessment		
3.a. Assessments are relevant (moves student to the appropriate level at the appropriate time) (Scores are realistic).		
3.b. Assessments are logical.		
3.c. Assessments are varied.		
Assessment Subtotal		
4. Performance Feedback		
4.a. Feedback is timely.		
4.b. Feedback is meaningful (related to objectives and content).		
4.c. Positive reinforcement is provided for correct response or action.		
4.d After Action Review is provided for incorrect responses.		
4.e. Opportunity to increase score or replay until the next level isachieved.		
Feedback Subtotal		
Instructional Gaming Features Total		

APPENDIX H
McNEESE GAME ASSESSMENT TOOL DIRECTIONS

McNeese Game Assessment Tool

Directions

In order to achieve a quality assessment this tool should be used accordingly.

Choose the game to be assessed and install it on a local PC that should be used with Microsoft Access 2003 or above. .

Review the game using the following Matrix in order.

1) Evaluation Summary Sheet

The Evaluation Summary Sheet tool will be used to in the evaluation process to assess "fitness for purpose" tool. Place a score one (1 through 5) with one being the lowest score and five the highest score in the following fields; Instructional Content, Instructional Activities, Performance Assessment and Feedback. No matter what the overall score, a score of one (1) on any criterion in this matrix should be considered a major problem, requiring redesign of the instructional product. A score of two (2) on any criterion should be considered a problem and may require redesign. The higher the score in this assessment the higher the quality value of the product.

2) **Instructional Quality Usability Criteria Summary Sheet**

No one wants to play games that are frustrating or difficult to master. Usability is about maximizing effectiveness, efficiency, and satisfaction. Using the Instructional Quality Usability Criteria, assess each game on a scale of (1 through 5). One is the lowest score and five is the highest score for usability. No matter

what the overall score, a score of one (1) on any criterion should be considered a major problem, requiring redesign of the instructional product. A score of two (2) on any criterion should be considered a problem and may require redesign.

3) **Content Assessment Matrix**

The Content Criteria Instrument will be used to assess in each game to determine if the game incorporates any of the following attributes for content, such as facts or skills. The content criterion is based on Blooms Taxonomy information. This instrument will be used for each individual game. Circle a yes or no for each block in the Content Assessment Matrix depicting if the game being assessed as any of the content attributes within the game.

4) **Cross-Reference Game and Learner Outcome Matrix**

The cross reference game and learner outcome matrix looks at different games to see if they provide clear cut objectives based on relevant content. The objectives provide insight into expected learner outcomes. Game style is also very important attribute to identify because it will help to assess repurpose efforts if needed. Game style refers to how the game is designed, is it a goal oriented game or is it a competitive game design. Using the Content Assessment Matrix, fill in the attributes in the Learner Outcome, Content, and Game Style boxes for this part of the assessment tool.

5) **NTTL's Objective Cross Reference Matrix**

The cross reference game and learner outcome matrix looks at different games to see if they provide clear cut objectives based on relevant content. The objectives provide insight into expected learner outcomes. Game style is also very important attribute to identify because it will help to assess repurpose efforts if needed. Game style refers to how the game is designed, is it a goal oriented game or is it a competitive game design. This is a very important part of the tool. After filling in the cross reference game and learner outcome matrix, look at each box in the NTTL's Objective Cross Reference Matrix to see if any of the objectives within the game actually relate to any of the naval objectives presented in this matrix. Only put a yes in the box if the objective correlates to the game objective, then fill in the attribute boxes associated with objective.

6) **Final Report Summary**

In the final summary report all of the information is gathered to provide an overall look at each product.

Using the following format

Game Name Date of Assessment

Section A:

Provide an overall score for the Evaluation Summary Sheet noting any attributes with a score of 2 or less.

Section B:

Provide an overall score for the Evaluation Summary Sheet noting any attributes with a score of 2 or less.

Section C:

In a short paragraph depict all of the content attributes that were circled yes in the Content Assessment Matrix. Then summarize how this related to the objectives within the cross reference game and learner outcome matrix and what the Learner Outcome, Content, and Game Style suggested were.

Section D.

Summarize how many of the naval objectives were identified within the NTTL's Objective Cross Reference Matrix.

Section E:

If the product provides high scores with no 1's or 2's in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and provides clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game can be highly recommended to support naval training purposes.

If the product provides low scores with only a few 1's or 2's in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and provides clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game can be recommended for repurpose to support naval training purposes.

If the product provides high scores with no 1's or 2's in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and provides clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game can be recommended major rework and repurpose to support naval training purposes.

If the product provides low scores with in either the Evaluation Summary Sheet or the Instructional Quality Usability Criteria Summary Sheet and no clear cut objectives that can be identified within the Naval Tactical Task List Objective Matrix, then the game can not be recommended for use to support naval training purposes.

Please provide the appropriate information.

Student Questionnaire

Please answer the following questions concerning the analysis tool used in this experiment. Then write a small recommendation summary paragraph at the bottom of the page.

- Was the assessment tool effective in analyzing game products? Yes/No
- Did each instrument meet their purpose of design? Yes/No
- Does the analysis tool need improvement, if so how much?
- Instrument 1 – no improvement needed, very little improvement, moderate improvement, discard instrument
- Instrument 2 – no improvement needed, very little improvement, moderate improvement, discard instrument
- Instrument 3 – no improvement needed, very little improvement, moderate improvement, discard instrument
- Instrument 4 – no improvement needed, very little improvement, moderate improvement, discard instrument
- Instrument 5 – no improvement needed, very little improvement, moderate improvement, discard instrument

APPENDIX I

STUDENT RESPONSE QUESTIONAIRS

Student 1 Response

Question					Answer
Was the assessment tool effective in analyzing game products?			Yes	No	Yes
Did each instrument meet their purpose of design?			Yes	No	Yes
Does the analysis tool need improvement, if so how much?					
Instrument 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 5	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student Recommendations	The main issue I have is that I do not know what to put in the boxes for assessments 4 and 5. (Cross-Reference Game and Learner Outcome Matrix and NTTL's Objective Cross Reference Matrix). Am I putting a rating? A checkbox? Furthermore, I do not understand the scaling (if any) for "Learner Outcomes", "Content", and "Game Style". If we're rating good/bad or present/not present, what constitutes bad game style or missing game style? Suggest that clearer instructions are needed when reviewing these instruments. I also believe that if you checked the content associated with the game that the appropriate learning activities and possible game styles should automatically be transferred into the information for the NTTL and Game Objective Cross Reference Matrix.				

Student 2 Response

Question					Answer
Was the assessment tool effective in analyzing game products?			Yes	No	Yes
Did each instrument meet their purpose of design?			Yes	No	Yes
Does the analysis tool need improvement, if so how much?					
Instrument 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 5	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student Recommendations	Search and Rescue 3 does not appear to be compatible with Windows Vista. I can run it but when I try to fly, the screen goes crazy. I recognize that we may be able to get all of this working in the lab, but there is too little time to do a complete analysis. I think that if you correlated game objectives with objectives using an automated database it would speed up the analysis process. Automating the tool to simplify the work would add efficacy to the tool. I could not use the games in Apple, so I had to use the lab computers, which are Vista.				

Student 3 Response

Question					Answer
Was the assessment tool effective in analyzing game products?			Yes	No	Yes
Did each instrument meet their purpose of design?			Yes	No	Yes
Does the analysis tool need improvement, if so how much?					
Instrument 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 5	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student Recommendations	Coordinating to transfer the physical boxes of the games has proven more time-consuming than anticipated. We were trying to pass the games along, but coordinating a time when all of are available takes nearly a day itself. So these games have not been going around that fast. I might be the 3rd or so person to have them. Plus, you need the CD's to run the game, so only one person can work on this study at a time.				

Student 4 Response

Question					Answer
Was the assessment tool effective in analyzing game products?			Yes	No	Yes
Did each instrument meet their purpose of design?			Yes	No	Yes
Does the analysis tool need improvement, if so how much?					
Instrument 1	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 2	no improvement needed	very little improvement	moderate improvement	discard instrument	no improvement needed
Instrument 3	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 4	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Instrument 5	no improvement needed	very little improvement	moderate improvement	discard instrument	moderate improvement
Student Recommendations	Suggest putting a programmable algorithm into the tool so that an automated search could be done to cross-reference game objectives to training objectives.				

LIST OF REFERENCES

Ahdell, R. Andresen G. (2001). Games and simulations in workplace eLearning. Norwegian University of Science and Technology. Department of Industrial Economics and Technology Management. Master of Science Thesis: Retrieved from http://www.twitchspeed.com/site/download/thesis_final.pdf

Air University (1990). *Battle Focused Training: Appendix G after action reviews.* Retrieved from Maxwell AFB, AL website: http://www.au.af.mil/au/awc/awcgate/army/fm25-101/fm25-101_app_g.htm

Allen, R.B. Breckler, S.J. (1983). Human factors of telephone-mediated interactive electronic games. Consortium of Naval Libraries: SPAWAR Systems Center. Retrieved from http://portal.acm.org/citation.cfm?id=806668&coll=portal&dl=ACM

Alliger, G. M., & Janak, E. A. (1989). Kirkpatrick's levels of training criteria: thirty years later. *Personnel Psychology*, 42, 331-342.

Anderline, L. Gerardi, D. & Lagunoff, R. (2006). The folk theorem in dynastic repeated games. University of Connecticut, Storrs, CT: Retrieved from http://ideas.repec.org/p/wpa/wuwpga/0410001.html

Anderson, R. C., & Biddle, W. B. (1975). On asking people questions about what they are reading. In G. Bower (Ed.), *Psychology of learning and motivation*. *Advances in research and theory,volume*(9). New York: Academic Press.

Barbazette, J. (2004). *Instant case studies: How to design, adapt, and use case studies in training*. Hoboken, NJ: Jossey-Bass.

Bell, H.H., & Waag, W.L. (1998). Evaluating the effectiveness of flight simulators for training combat skills. *International Journal of Aviation Psychology,* 8(3), 223-242.

Bloom, B.S. (1956). *Taxonomy of educational objectives, the classification of educational goals – handbook I: cognitive domain.* New York, NY: McKay

Bott, D.W. (1995). Maintaining language proficiency. *Military Intelligence Professional Bulletin, 21*(4). Retrieved from http://www.fas.org/irp/agency/army/mipb/1995-4/bott.htm

Bowman, A.L. (1996). *Analysis of FA-18 pilot's opinion of maintaining readiness through the use of simulation.* Jacksonville, FL: Masters Thesis submitted to Embry-Riddle Aeronautical University, NAS Cecil Field Resident Center.

Brannick, M.T., Prince, C., Salas, E., & Stout, R. (1995). Assessing Aircrew coordination skills in TH-57 pilots. *C. Bowers and F. Jenstch, Emperical Research Using PC-*

Based Flight Simulations. Columbus, OH: Eight International Symposium on Aviation Psychology.

Brannick, M.T., Prince, C., Salas, E., and Stout, R. (1998). Can PC-based systems enhance teamwork in the cockpit? Manuscript submitted for publication, *Human Factors.*

British Educational Communications and Technology Agency. (2005). *Computer games in education project: Aspects*. Retrieved from http://partners.becta.org.uk/index.php?section=rh&rid=11200

Bruner, J. S. (1960). *The process of education*. Cambridge, MA: Harvard University Press.

Burgos, D., Tattersall, C., & Koper, R. (2005). *Re-purposing existing generic games and simulations for e-learning*. Educational Technology Expertise Center (OTEC) Open University of the Netherlands Valkenburgerweg, Netherlands. Retrieved from http://dspace.ou.nl/handle/1820/508

Burki-Cohen, J., Soja, N.N., & Longridge, T. (1998). Simulator platform motion - The need revisited. *International Journal of Aviation Psychology, 8(3), 293-317.*

Business Study Solutions. (2005). *Quality online study resources, glossary*. Retrieved from http://www.businessstudysolutions.com/glossarym.htm

Cannon-Bowers, J. A., Salas, E., Tannenbaum, S. I., & Mathieu, J. E. (1995). Toward theoretically based principles of training effectiveness: A model and initial empirical investigation. *Military Psychology, 7(3), 141-164.*

Chen, J.Y.C. (2003). Utility of game instructions. *U.S. Army Research Institute for the Behavioral and Social Sciences.* Alexandria, VA: Retrieved from http://www.hqda.army.mil/ari/pdf/FY03%20Biblio.pdf

Chen, S. and Michael, D. (2005). Proof of learning: assessment in serious games. *CMP Game Group*. Retrieved from http://www.gamasutra.com/features/20051019/chen_01.shtml

Clark, D. (1999b). *Bloom*. Retrieved from http://www.nwlink.com/~donclark/hrd/history/bloom.html

Clark, D. (1999d). *Learning domains or Bloom's Taxonomy: The three types of learning.* Retrieved from http://www.nwlink.com/~donclark/hrd/bloom.html

Clark, D. (2000). *A time capsule of training and learning.* Retrieved from http://www.nwlink.com/~donclark/hrd/history/history.html

Coghlan, D. & Brannick, T., (2001). *Doing action research in your own organization*. Thousand Oaks, CA: Sage Publications Inc

Csikszentmihalyi, M. (1985). Emergent motivation and the evolution of self. In D. A. Kleiber & M. L. Maehr (Eds.), *Advances in Motivation and Achievement, volume* (4) 93–119. Greenwich, CT: JAI Press.

Dalton, D. W. (1986). The efficacy of computer-assisted video instruction on rule learning and attitudes. *Journal of Computer-Based Instruction, 13, 122-125.*

Department of Defense, (2001). *OPNAVINST 3500.38/A/USCG COMDTINST M3500.* Washington D.C.

Dempsey, J. V., Lucassen, B., Gilley, W., & Rasmussen, K. (1993–1994). Since Malone's theory of intrinsically motivation instruction: What's the score in the gaming literature? *Journal of Educational Technology Systems, 22*(2), 173–183.

Dennis, K. A., & Harris, D. (1998). Computer-based simulation as an adjunct to ab initio flight training. *International Journal of Aviation Psychology, 8*(3), 261–276.

Driscoll, M. (2000). *Psychology of learning for instruction* (2nd ed. pp. 341-396) Needham Heights, MA: Allyn & Bacon A Pearson Education Company.

Driskell, J. E. & Dwyer, D. J. (1984). Microcomputer videogame based training. *Educational Technology, 11-16*.

Fitts, P M. & Posner, M. (1967). *Human performance*. Monterey, CA: Brooks/Cole.

Federation of American Scientists (2005). *Military definitions*. Washington, DC: Retrieved from http://www.fas.org/news/reference/lexicon/mildef.htm

Fowlkes, J., Dwyer, D.J., Oser, R.L., & Salas, E. (1998). Event-based approach to training (EBAT). *International Journal of Aviation Psychology,* 8(3), 209-221.

Freeman, D. (2004). *Creating emotion in games: The craft and art of emotioneering*. Indianapolis, IN: New Riders.

Freeman, D. (2006). The 32 categories of emotioneering. Retrieved from http://www.freemangames.com/idea/6_4.php

Gaba, D. (2005). What are the similarities and differences between simulation and games? Retrieved from SimWorkshop Community Stanford University website: http://medblog.stanford.edu/simworkshop/archives/2005/03/what_is_the_dif.html

Gay, L. R., & Airasian, P. (2000). *Educational research*. Upper Saddle River, NJ: Prentice-Hall.

Gagne, R. (1962). Military training and principles of learning. *American Psychologist,* 17, 263-276.

Gagne, R. (1985). *The conditions of learning* (4th ed.) New York: Holt, Rinehart & Winston.

Gagne, R. (1987). *Instructional technology foundations*. Hillsdale, NJ: Lawrence Erlbaum Assoc.

Gagne, R. & Driscoll, M. (1988). *Essentials of learning for instruction* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Gagne, R., Briggs, L. & Wager, W. (1992). *Principles of instructional design* (4th ed.). Fort Worth, TX: HBJ College Publishers.

Gredler, M. E. (2001). *Learning and instruction; theory into practice* (4th ed. pp. 129-167). Upper Saddle River, NJ: Merrill Prentice Hall

Goldstein, I. L. (1974). *Training: Program development and evaluation*. Monterey, CA: Brooks/Cole

Goldstein, I. L. (1993). *Training in organizations*. Pacific Grove, CA: Brooks/Cole.

Hagman, J. D. (1980). *Effects of presentation- and test-trial training on motor acquisition and retention* (TR 431). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Hall, E. R., Ford, L. H., Whitten, T. C., & Pylant, L. R. (1983). *Knowledge retention among graduates of basic electricity and electronics schools* (Technical Report 149). Orlando, FL: Training and Analysis Evaluation Group.

Hassard, J. (2006). *Jerome bruner and discovery learning*. Retrieved from Georgia State University website: http://scied.gsu.edu/Hassard/mos/2.7.html

Hayashi, Y., Tsumoto H., Ikeda, M., & Mizoguchi, R. (2001). *Toward an ontology-aware support for learning-oriented knowledge management*. Proc. of the 9th International Conference on Computers in Education (ICCE'2001), (pp. 1149-1152.) Mihogaoka, Ibaraki, Osaka, Japan: The Institute of Scientific and Industrial Research, Osaka University.

Hays R. T. (2005). *The effectiveness of instruction games: A literature review and discussion.* Technical Report 2005-004. Orlando FL: Naval Air Warfare Center Training System Division.

Hays, R. T., & Singer, M. J. (1989). *Simulation fidelity in training system design: Bridging the gap between reality and training*. New York: Springer-Verlag.

Heinich, R. Molenda, Y, & Russel, J. (1993). *Instructional media and the new technologies of instruction*. New York: Wiley.

Herz, J. C., & Macedonia, M. R. (2002). Computer games and the military: Two views. *Defense Horizons* 11. Retrieved from http://www.ndu.edu/inss/DefHor/DH11/DH11.htm

Hogan, R. M. & Kintsch, W. (1971). Differential effects of study and test trials on long-term recognition and recall. *Journal of Verbal Learning and Verbal Behavior, 10,* 562-567.

Holmquist, J.P. (2004). Playing games. *Military Training Technology Online Archives, 9* (5). Retrieved from http://www.military-training-technology.com/article.cfm?DocID=665

Huitt, W. (2001). Motivation to learn: An overview. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University. Retrieved from http://chiron.valdosta.edu/whuitt/col/motivation/motivate.html

Jentsch, F., & Bowers, C.A. (1998). Evidence for the validity of PC-based simulations in studying aircrew coordination. *International Journal of Aviation Psychology, 8*(3), 243-260.

Jones, M.B., Kennedy, R.S. & Bittner, A.C. Jr. (1981). A video game for performance testing. *American Journal of Psychology*. *March 1981 94*(1), 143-152.

Kauchak, M. (2003). Creating a world classroom. *Military Training Technology Online Archives 8*(4). Retrieved from http://www.military-training-technology.com/article.cfm?DocID=268

Kaufman, R., Thiagarajan, S. and MacGillis, P. (1997). *The guidebook for performance improvement*. San Francisco, CA: Jossey-Bass/Pfeiffer.

Kennedy, R.S, Jones, M. B., and Bittner, A. C. Jr., (1981). A video game for performance testing. *American Journal of Psychology 94*(1), *143-152*. Board of Trustees of the University of Illinois

Kessell, C. J., & Wickens, C. D. (1982). The transfer of failure-detection skills between monitoring and controlling dynamic systems. *Human Factors, 24,* 49-60.

Kirkpatrick, D. L., (1976). Evaluation of training. In R. L. Craig (Ed.), *Training and Development Handbook* (2nd ed., pp. 18-1-18-27). New York: McGraw-Hill.

Klein, J. D. (1992). Effect of instructional gaming and reentry status on performance and motivation. *Contemporary Educational Psychology, 17,* 364-370.

Knerr, B. W., Simutis, Z. M., & Johnson, R. M. (1979). *Computer-based simulations for maintenance training: Current ARI research* (Technical Report 544). Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences. (Defense Technical Information Center No. ADA139371)

Kort, B., Reilly, R., & Picard, R. W. (2001): An affective model of interplay between emotions and learning: Reengineering educational pedagogy—building a learning companion. ICALT 2001: 43-48. Retrieved from http://vismod.media.mit.edu/tech-reports/TR-547.pdf

Krumme, G. (2005). *Major categories in the taxonomy of educational objectives (Bloom 1956).* Retrieved from University of Washington, Seattle, WA website: http://faculty.washington.edu/krumme/guides/bloom1.html

Kulhavy, R.W., & Stock, W.A. (1989). Feedback in Written Instruction: The Place of Response Certitude. *Educational Psychology Review, 1,* 279-308.

Laitinen, S. (2005). Better games through usability evaluation and testing. *Gamsutra Online Magazine*. Retrieved from http://www.gamasutra.com/features/20050623/laitinen_01.shtml

Latham, G. P., & Locke, E. E. (1987). Goal-setting: A motivational technique that works. In R. M. Steers & L. W. Porter (Eds.), *Motivation and Work Behavior,* 120-134. New York: McGraw-Hill.

Lenoir, T. (2000). All but war is simulation: The military –entertainment complex. *Configurations Journal, Fall 2000*. Stanford University.

Lenoir, T. (2003). Fashioning the military-entertainment complex. *Journal of Chemical Technology & Biotechnology* (pp. 14–16) Retrieved from.

http://www.stanford.edu/dept/HPS/TimLenoir/Publications/Lenoir_FashioningMEC.pdf

Lintern G. & Kennedy, R. S. (1984). Video game as a covariate for carrier landing research. *Perceptual and Motor Skills Journal*, 58, 167-172.

Malone, T. W. (1984). Heuristics for designing enjoyable user interfaces: Lessons from computer games. In J. C. Thomas and M. L. Scheider (Eds.), *Human Factors in Computer Systems.* Norwood, NJ: Ablex Publishing Company.

Mayer, R. E. (1990). *The promise of cognitive psychology*. Lanham, MD: University Press of America.

Meier, D. (2000). *The accelerated learning handbook: A creative guide to designing and delivering faster, more effective training programs*. New York: McGraw-Hill.

Mergel, B. (1998). Instructional design and learning theory. *Educational Communications and Technology*. University of Saskatchewan. Retrieved from http://www.usask.ca/education/coursework/802papers/mergel/brenda.htm

Microsoft Corporation. (2005). *Windows audio/video excellence requirements in Longhorn*. Microsoft Corporation Los Angeles, CA: Retrieved from http://www.microsoft.com/whdc/winhec/tracks2005/w05_mediapcarch.mspx

Mish, F.C. (1993). *Merriam-webster's collegiate dictionary tenth edition.* Springfield, MA: Merriam-Webster, Incorporated.

Nagle, R. (2001). Learning with games: instruction or enrichment? *Enrichment Games and Instructional Design*. Retrieved from http://www.imaginaryplanet.net/essays/literary/games/games1.php

Newell, K. M. (1974). Knowledge of results and motor learning. *Journal of Motor Behavior, 6,* 235-244.

Oser, R. (1994). Computer-based interactive courseware: A medium for team training? *The 38th Annual Meeting of Human Factors and Ergonomic Society,* Nashville, TN.

Pallant, J. (2001). *SPSS survival manual*. Glasgow United Kingdom: Bell & Bain Ltd.

Patsula, P. (1999). Gagne - applying learning theories to online instructional design. Retrieved from Network of Small Business Patsula Media websites: http://www.patsula.com/usefo/webbasedlearning/tutorial1/gagne_strategies.htm

Pearson Education, (1984). *Benjamin S. Bloom taxonomy of educational objectives*. Boston, MA: Allyn and Bacon. Retrieved from http://www.coun.uvic.ca/learn/program/hndouts/bloom.html

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and Applications* (2nd ed.) Columbus, OH: Merrill-Prentice Hall

Prensky, M. (2001). *Digital game-based learning.* Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Why%20Games%20Engage%20Us.pdf

Prensky, M. (2001). *Simulation": Are they games? Digital Game-Based Learning* McGraw-Hill. Retrieved November 19, 2006 from http://www.marcprensky.com/writing/Prensky%20-%20Simulations-Are%20They%20Games.pdf

Prensky, M. (2001). *True believers: Digital game-based learning in the military. American Society for Training and Development*. Retrieved from

http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Game-Based%20Learning-Ch10-Military.pdf

Prince, C. & Salas, E. (1991, April). The utility of low fidelity simulation for training aircrew coordination skills. *Proceedings of the International Training Equipment Conference* (pp. 87-91). Masstricht, Netherlands.

Randel, J. M., Morris, B. A., Wetzel, C. D., & Whitehill, B. V. (1992). The effectiveness of games for educational purposes: A review of recent research. *Simulation & Gaming, 23*(3), 261–276.

Rantz, W.G. (1998). *Effects of low fidelity computer software training on collegiate aviation student's affective and psychomotor skills.* Kalamazoo, MI: Manuscript originating from the Western Michigan University School of Aviation Sciences.

Ricci, K.E. Salas, E. & Cannon-Bowers, J.A. (1996). Do computer-based games facilitate knowledge acquisition and retention? *Military Psychology*, 8, 295-320

Richardson-Klavehn, A., & Bjork, R. A. (n.d.). *Memory, long-term*. Retrieved from Goldsmiths College, University of London, London, UK website: http://instruct1.cit.cornell.edu/courses/phi663/ecs%20memory%20long%20term1.pdf

Rock Island District, US Army Corps of Engineers (2004). *After action review reference guide*. Retrieved from U.S. Army Engineer District, Rock Island, IL website: http://www.mvr.usace.army.mil/PublicAffairsOffice/2003AnnualReport/DistrictHighlights/AAR%20Guide.doc

Shavelson, R.J., (1996). *Statistical reasoning for the behavioral sciences*. Third Edition Needham Heights. MA: Allyn & Bacon.

Shipley, C.W. LTC (1997). Professional dialogue - what do you mean "how am I going to fix it?" *Professional Bulletin Spring 1997.* Retrieved from U.S. Army Quartermaster Center and School Fort Lee, VA website: http://www.quartermaster.army.mil/oqmg/Professional_Bulletin/1997/Spring/shipley.html

Sage, N. (2005). Gagne. *The Psi Café*. Retrieved from http://www.psy.pdx.edu/PsiCafe/KeyTheorists/Gagne.htm

Scott, A. (2003). *On-line animations of time evolving physical systems*. Retrieved from University of Wisconsin-Stout, Menomonie, WI website: http://physics.uwstout.edu/staff/scott/animate.html

Seay, J. (1997). *Education and simulation/gaming and computers*. Retrieved from Technology and Education College of Charleston, Charleston, SC website: http://www.cofc.edu/~seay/cb/simgames.html

Simons, K. L. (1993). New technologies in simulation games. *System Dynamics Review*, *9*(2), 135–152.

Shrestha, L. B. (1987). *Computer based training: The effects of game characteristics on motivation and learning*. Orlando, FL: Master's thesis, University of Central Florida.

Smith, L. & Mann, S. (2002). *Playing the game: A model for gameness in interactive game-based leaning.* Otago Plytechnic, Dunedin, New Zealand: Retrieved from http://site.tekotago.ac.nz/staticdata/papers02/papers/smith397.pdf

Tannenbaum, S. I., & Yukl, G. (1992). Training and development in work organizations. *Annual Review of Psychology, 43,* 399-441.

Tarr, R. W., & Morris, C. S., & Singer, M. J. (2003). *Low-cost PC gaming and simulation research: Doctrinal survey*. Retrieved from U.S. Army Research Institute for the Behavioral and Social Sciences. Alexandria, VA website: http://www.hqda.army.mil/ari/pdf/FY03%20Biblio.pdf

Tessmer, M., Jonassen, D., & Caverly, D. C. (1989). *Designing and planning computer assisted instruction: A workbook*. Littleton, CO: Libraries Unlimited.

Tessmer, M., & Wedman, J. F. (1990). A layers-of-necessity instructional development model. *Educational Technology: Research and Development, 38*(2), 77–85.

Thorndike, E.I., (1913). *Educational psychology: Vol. I. The original nature of man*. New York: Teachers' College Press.

Tritten, J.T. Dr., (1997). Joint mission-essential tasks joint vision 2010, core competencies and global engagement. *Aerospace Power Journal.* Retrieved from http://www.airpower.maxwell.af.mil/airchronicles/apj/apj97/fal97/tritten.html

Unites States Air Force, (2004). *Interagency complex contingency operations handbook: chapter 4: assessment tools.* Retrieved from Air War College Gateway & USAF Counter Proliferation Center website: http://www.au.af.mil/au/awc/awcgate/ccoh/chapter4.doc

U.S. Department of Defense. (1996). *Army regulations AR 635–200* • 26 June 1996. Retrieved from http://www.army.mil/usapa/epubs/pdf/r635_200.pdf

U.S. Department of Defense. (1997). *DoD modeling and simulation (M&S) glossary.* (DoD 500.59-M). Alexandria, VA: Defense Modeling and Simulation Office.

U.S. Department of Defense, (2000). Navy Tactical Task List 3.0. Newport, RI: Retrieved from http://www.nwdc.navy.mil/Library/UNTL_NMETL/default.aspx

Vroom, V. H. (1964). Work and motivation. New York: Wiley.

Young, L. R. (1969). On adaptive manual control. *IEEE Transactions on Man-Machine Systems, MMS-10,* 229-331.

Wetzel, S. K., Konoske, P. J., Montague, W. E. (1983, May). *Estimating skill degradation for aviation antisubmarine warfare operators (AWs): Loss of skill and knowledge following training (NPRDC SR 83-31).* San Diego, CA: Navy Personnel Research and Development Center.

Wilson, B. G., Jonassen, D. H., & Cole, P. (1993). Cognitive approaches to instructional design. In G. M. Piskurich (Ed.), *The ASTD Handbook of Instructional Technology,* (pp. 21.1-21.22). New York: McGraw-Hill. Retrieve from http://www.cudenver.edu/~bwilson

Zagare, F.C., (1984). *Game theory, concepts & applications.* Beverly Hills, CA: Sage Publications, Inc.