# “Revolution in Training”

## Executive Review of Navy Training

**Final Report**

**July 31, 2001**

ERNT

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# Executive Summary

When the Navy is not fighting, it is training. When the Navy is fighting, it is training. The most important ingredient in the Navy's success is the talent, energy, dedication, skill and courage of Sailors. Their growth and development must be the highest priority of Navy leaders.

This is the report to the Chief of Naval Operations on the results of the Executive Review of Navy Training. The Review and this report respond to the directions of our charter of October 2000. We were asked to examine Navy training and make substantive recommendations: for improving and aligning organizations; for incorporating new technologies into Navy training and exploiting opportunities available from the private sector; and for developing a continuum of lifelong learning and personal and professional development for Sailors.

As we reviewed the state of Navy training today, we discovered some important things. First, demands for training are increasing, as technology plays an ever more important role in naval warfare. In fact, the number of missions is growing for most platforms, and the complexity of the jobs for Sailors within those platforms is growing as well. Second, the supply of experienced Sailors (especially Enlisted Sailors) is declining as the Sailors who represent the experience "dividend" remaining from the drawdown of the 1990s reach retirement eligibility. Third, the recruiting market is as challenging as it has ever been, while enlisted attrition continues to deplete the ranks of trained Sailors.

We reached two important conclusions in light of what we discovered above. Today's Navy training system is neither postured nor organized to produce and maintain the trained force of Sailors required in this environment. And, the gap between what high quality Sailors and potential Sailors want and expect in their personal and professional learning, and what the Navy is prepared to deliver, is too great to make the Navy an employer of choice today. However, there are extraordinary opportunities for the Navy to improve in both areas. Industry and academia are showing the way in some respects. Research tells us a great deal about the science of learning; that science can be applied to Navy training. Research and the experience of industry are showing us how to impart knowledge, skills and abilities in new ways to improve job performance. And in industry, commercial enterprises are telling us that investments in the learning of people pay off in improvements in profitability and employee effectiveness and satisfaction, and reductions in employee turn over.

We recommend new approaches to thinking about training and learning. We recommend new alignments of organizations to: develop human performance requirements; build solutions for improving human performance; deliver training; and assess the outcomes of the process. We recommend alignment of resources and requirements in training, and alignment of authority, responsibility and accountability in determining requirements, developing and delivering learning materials, and measuring outcomes. Finally, we recommend a campaign to put in place a continuum of learning for every Sailor, Officer and Enlisted, beginning the day that person is sworn in, and carrying through every day of service. For Sailors who stay to retirement, we recommend the benefits of the continuum persist through all the days of retirement as well. In the body of the report we explain each of these recommendations and the reasons behind it.

In addition, we believe that an Implementation Team must form quickly; that substantial early actions are important to demonstrating that there will be real benefits to the Revolution in Training. We suggest what some of those immediate steps might be. The report concludes with a brief story that ties together some of the potential benefits of the Revolution for an exemplary Sailor.

Executive Review of Navy Training
Final Report
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The revolution is inevitable; it
is underway outside the Navy;
we must harness it, focus it, and
bend it to the Navy's needs.

# I. Introduction

## *Charter*

The Chief of Naval Operations (CNO) chartered the Executive Review of Navy Training (ERNT) to develop a strategy and implementation plan for revolutionizing Navy training.

The Revolution has three overarching objectives. The first is to develop a lifelong learning continuum, which exploits technology, optimizes Sailors' time, minimizes students' time away from their parent commands, makes the best use of limited resources, and produces motivated and well-trained Sailors. The second is to determine the most effective learning strategy and delivery methods to ensure Sailors possess the knowledge, skills, and abilities to do their jobs. The third is to define the most effective organizational alignment for Navy training—one that simplifies the authority, responsibility, and accountability for Navy training functions while fostering continuous innovation and improvement. Improving the Total Force, both active and reserve components, is the aim of the Revolution in Training.

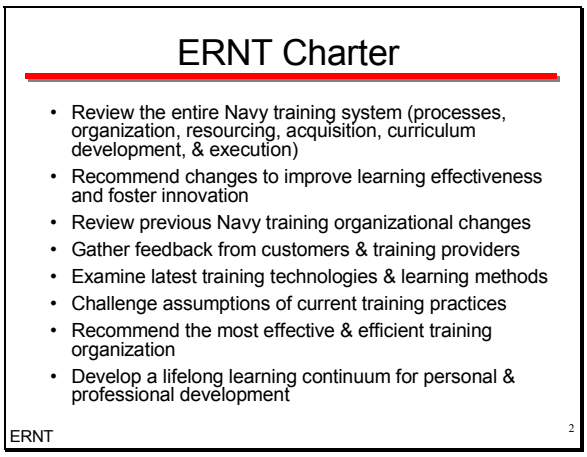

Figure 1. *Executive Review of Navy Training charter*

The ERNT charter was specific. We were directed to review Navy training as a system, from requirements and policy generation to execution in all areas of training, including resourcing, manning, and curriculum development. We were then to recommend changes that would improve learning effectiveness, enable the Navy to meet existing and future requirements, and support the acquisition of new systems.

The charter also tasked us to look at past Navy training organizational changes—to examine reports of earlier studies, recommendations, and the effectiveness of steps taken in response to those recommendations. We were asked to gather feedback from customers and training providers, and to conduct a thorough examination of the latest technologies and methodologies that are being used in the commercial sector. We were also asked to challenge the assumptions upon which we base our training today. Are these assumptions right? Are they serving us well? Are they producing the output required for us to meet the challenges of the future?

The charter tasked us to provide recommendations for developing the most effective and efficient training organization, an organization with features that enhance innovation and facilitate rapid implementation of revolutionary ideas. Our organizational recommendations were to address the optimum alignment of training resources. Finally, we were asked to develop a lifelong learning continuum, one that promotes and facilitates continual personal and professional development for all Navy Sailors.

The ERNT team was structured to support these goals and objectives. It comprised Navy military (both Officer and Enlisted) and civilian personnel, along with members from academia, research institutions, and industry. Team members were selected from various communities to provide background and expertise in many areas of Navy training and education. Addition information on each of the 24 ERNT Working Group members can be found in Appendix D.

## Scope

Navy training is big business. The Navy spends roughly 14 percent of its total annual funding, or about $10B, on training and training-related activities. Tens of thousands of Sailors, Department of the Navy civilians, and contractors are part of the process. More than one thousand Navy places, high and small, deliver training and learning—providing over 900,000 learning opportunities to more than 460,000 active and Selected Reserve (SELRES) Sailors each year

The ERNT looked at all types of Navy training—from training in the Delayed Entry Program (DEP), through Recruit and Initial Skills Training, to Skills Progression and Professional Development. We also looked at all levels of fleet training, from individual through team and unit training, to battle group training.

The ERNT noted the interrelationships between training and other elements of an overall Human Resources Program including manpower, personnel, recruiting, rewards and incentive programs, and evaluation systems. We say more about these later in the report.

Our directions in the Executive Review of Navy Training were to focus on ships and squadrons, and, of course, Sailors. Nevertheless, we believe that what you will read in our report applies to Civilians of the Department of the Navy to almost the same degree that it applies to the men and women of the uniformed components. In fact, most of what we found in the form of challenges, all of what we discovered by way of opportunities, and all of what we recommend to improve training for units and for Sailors applies as well to the Civilian members of the Department of the Navy team.

## Structure of Report

This report comprises seven sections (see figure 2). Following this introduction, section two summarizes why the Navy must embark on this journey. We present what the ERNT team has learned in terms of the roles and functions that training serves, and the challenges that Navy training faces in supporting combat readiness. We outline training's role in maintaining and enhancing readiness. We summarize what we believe to be the most compelling reasons for the challenges the Navy faces. These are problems we believe will worsen in the coming decade and compel a revolution in training.

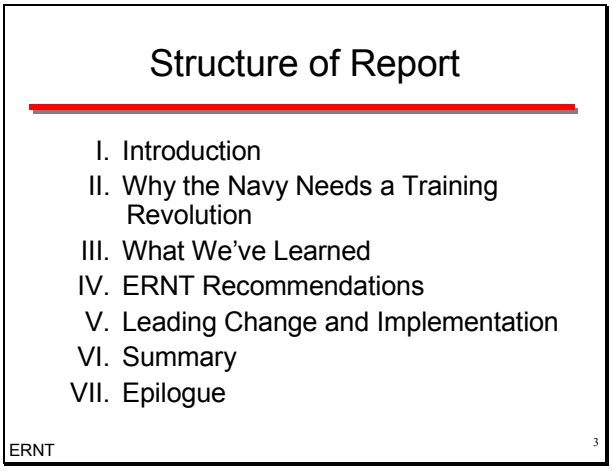

Figure 2. *Structure of report*

**Visualize….**

Open your mind and prepare to imagine the Navy of tomorrow: a Navy that values individual Sailors and learning; a Navy that nurtures life-long learning that is grounded in performance improvement and focused on the learner. Imagine new processes linking training, performance, feedback, and fleet readiness to personal growth and development. Visualize a Navy where training and education are available 24 hours a day, 7 days a week, anywhere in the world. Visualize a Navy where the Sailor has the time, means, and full command support to access that training and education. Visualize a Navy where leaders bear real responsibility and accountability for their subordinates' personal and professional growth. This

In the third section, we explore opportunities and lessons learned. We highlight some of the significant insights we gained from visiting industry leaders and Navy activities. This discovery phase of our review allowed us to evaluate the Navy's use of educational theory, ponder the impact of Generation Y, review the Science of Learning, and address the challenges of changing an organization's culture.

In section four, we present what the ERNT team believes are the most important elements of the Revolution in Training. We make these recommendations based on our beliefs about the roles training plays and on our own research. We also rely on lessons learned from past studies, meetings with industry and academia, and feedback that we received from Sailors.

In section five, we discuss the important steps we believe must be taken to bring the changes of the Revolution to life. In section six, we summarize our conclusions and collect our recommendations under four headings: process, organization, tools, and culture.

We finish with the story of a hypothetical Sailor who is concluding a career decades from now. It is a different, richer career to reflect on, one in which the Sailor has benefited from the Revolution in Training.

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# Why the Navy Needs a Training Revolution

The U.S. Navy (with the U.S. Marine Corps) is indisputably the world's dominant naval force. The Navy is forward deployed and meets its national security requirements and commitments. The Navy's training architecture is exceptionally robust and diverse, and readiness—the ultimate goal of training—remains at high levels. This might lead people to believe that the state of Navy training is as good as it can be or, at least, that Navy training is as good as it needs to be. Neither is the case. Navy training, like so many other aspects of the Armed Services' operations, has been "good enough" for long enough. In the aftermath of the Cold War, the Navy is in a period of extraordinary opportunity, and finds itself in a period in which there is no choice but to recast its attitudes about training and about individual and team learning and human performance.

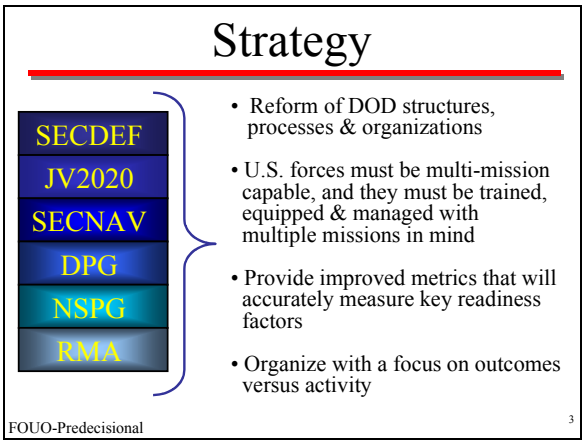


Figure 3. *Defense strategy initiatives and studies support a revolution*

Numerous military and government studies in recent years have demanded an overhaul of Cold War strategy and processes. Most recently, the Defense Science Board Training Task Force, in its report entitled "Training Superiority, Training Surprise," expressed concern about the current mix of military capability and readiness. The question is not whether training is meeting today's readiness requirements, but rather whether it will continue to do so. In particular, will the Navy be able in the future to attract the right number of people, with the talent and aptitude demanded by the Navy's missions? Will it be able to train them well in an environment of rapidly changing technology and the stiffest employment competition from the civilian sector since the beginning of the All-Volunteer Force?

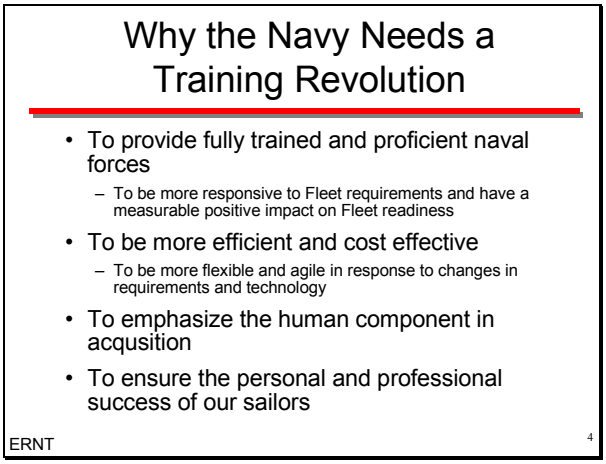


Figure 4. *Reasons why the Navy needs a training revolution*

In actuality, the Revolution in training is already under way in portions of the Navy, and across the whole of industry. The Revolution will proceed, with or without a Navy plan.

Finally, a Revolution is required in the way leaders think about the effects of training on Sailors. The Navy has a huge stake in the success of Sailors. Investments in Sailors' learning are essential to their success. Training is an investment, not a cost—that is a new way of thinking.

## To Provide Fully Trained and Proficient Naval Forces

Training has an obvious, perhaps the premier, role to play in readiness—preparing all Sailors to operate and maintain equipment and weapon systems at the highest levels of performance and readiness. Achieving this level of performance involves more than simply being able to train a certain number of Sailors each year. "Training" involves much more than simply "teaching." It is a complex, adaptive system. Training plays a part in every phase of the lives of Navy systems. Training considerations begin with the

acquisition of equipment that will require trained Sailors to operate and maintain it, continue to the identification of the functions that Sailors will have to perform to operate and maintain the equipment, link to the curriculum best suited to accomplishing that goal, and so on. Training is affected by decisions on infrastructure and funding, as well as by recruiting and keeping the right kinds of Sailors with the proper mix of skills. And training to achieve readiness is about accomplishing these missions in the most efficient and cost-effective way, while being responsive to rapidly changing requirements and technologies.

## Readiness and Increasing Training Requirements

Let's begin by looking at the area with the most direct training impact on readiness—the training process itself. Our research has led us to conclude that the Navy's current training structure is neither efficient nor effective to the degree demanded by the Navy's circumstances. The majority of core training processes, techniques, and procedures are more than 30 years old. They were rooted in the Cold War era when crews and their ships and squadrons had fewer missions, and conscription ensured a constant supply of manpower. The Navy's current training system supports too many redundant and duplicative capabilities and lacks the appropriate metrics to assess the relevance of its contributions to readiness or the effectiveness of the components of the training process.

The underlying foundation, the dynamic that drives the process, is the Required Operational Capabilities and Projected Operating Environments (ROC/POE) mechanism that assigns warfighting missions to individual units. This, in turn, drives all Navy manpower and training requirements. Increasing mission assignments results in additional systems, higher manpower requirements, expanded initial skills training, more Navy Enlisted Classifications (NEC), and so on.

The ROC/POE is an unconstrained, platform-centric process with a documented propensity to increase mission requirements. Increases often occur without regard for Sailors' ability to learn or the system's ability to train them. With rapidly changing technology, Sailors are being asked to learn faster and new devices and software updates are arriving in the fleet at an increasing rate. The number of Inter-Deployment Training Cycle (IDTC) requirements is increasing in every Navy warfare communities. Figure 5 shows one example in which the unit-level IDTC requirements for aviation squadrons increased by an average of 31 percent in less than a decade.

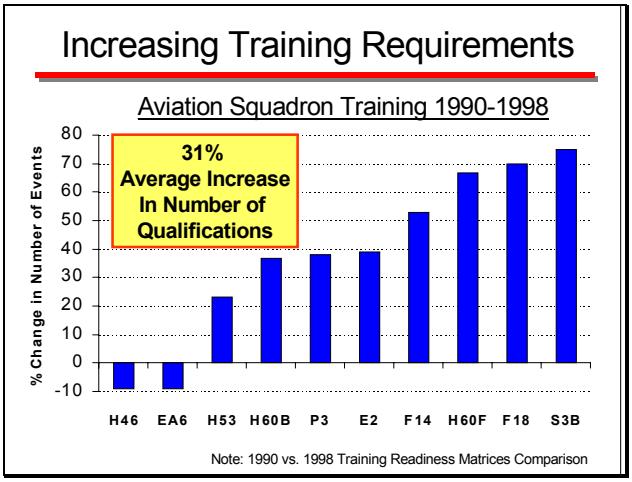


Figure 5. *Increase in aviation squadron IDTC training requirements (# events) from 1990 to 1998. Source: 2000 Training and Education (T&E) IWAR*

Training requirements are increasing for the individual Sailors as well. For example, there are four NECs for the Information Technology (IT) rating pertaining to network administration and network security. Navy-wide manning for these NECs ranges from 19 to 79 percent; the actual billets authorized greatly exceed today's manning. These shortfalls exist despite the fact that the Navy provides IT training at 10 different schoolhouses. The shortfall in IT expertise affects nearly every mission area, but Navy training is neither organized nor equipped to meet this rapidly increasing and changing requirement.

Later in this report, we suggest that the IT rating and the C4I mission area receive special attention for training improvement early in the Revolution in Training.

## Training Counts in Combat

How much training should be required during the IDTC? Today's training is frequently characterized as either "just in time" or "just in case" because the majority of training is conducted toward the end of the IDTC.

While units eventually form battle groups, and battle groups achieve the acceptable levels of readiness to deploy, little in the way of training support accompanies the deploying Sailor, unit, or group. As a result, much of the proficiency that individuals and teams achieved by the end of the IDTC atrophies during deployment.

Different warfare communities train to different levels of proficiency, with different priorities in different mission areas, using different training media and intervention techniques. This undoubtedly makes it more difficult to assemble a combat-ready Carrier Battle Group to emerge from the IDTC.

Historical evidence says that if the training system does not send adequately trained Sailors to the Fleet, they will not "catch up" in the Fleet —or in actual warfighting. In fact, operational performance is extremely sensitive to readiness levels at the onset of operations or combat. This is well documented (by early mission attrition data) from World War II, Korea, and Vietnam, and the lesson has been relearned in the recent Desert Fox and Noble Anvil operations.

Figure 6 shows the operational effectiveness of F/A-18 strike missions during Desert Fox as a function of their attack effectiveness. Cumulative kills increased for all units during the operation, regardless of their initial C-ratings; however, units with higher initial readiness outperformed their less well-prepared peers by a growing margin as the days passed. The message here is that better prepared units learn faster and perform better with time. If Sailors or units start out in a lower level of readiness, while they learn in the fight, they do not "catch up" in the fight.

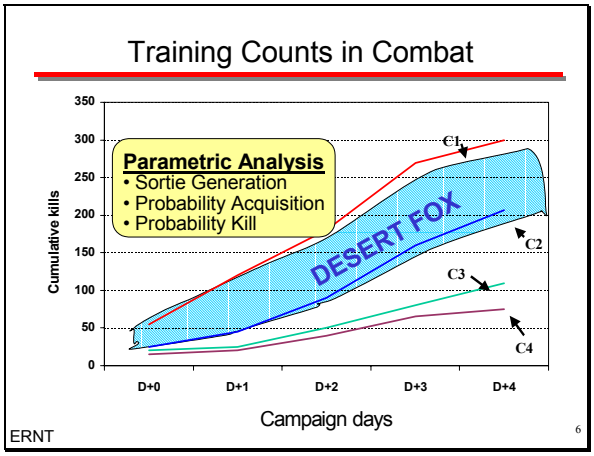


Figure 6. *On-station readiness affected strike performance during operation Desert Fox. Units that arrived on station with high readiness levels performed better and improved faster than those that started at lower levels. Source: 2000 T&E IWAR*

Ultimately, Navy training should be evaluated on its ability to meet warfighting readiness requirements. Training demands are increasing, in fact, accelerating. The training system must be dynamic, agile, and capable of responding quickly to changing Fleet needs. We explore whether this is possible in the current training environment with today's organization, funding, etc. in the next section.

# *Efficiency and Cost-Effectiveness are Important*

The Navy does not provide the very best training possible to its Sailors. Nor does the Navy apply a modern skills-based approach to assessing Navy jobs to determine the competencies Sailors need to perform well in those jobs. Navy training policy is fragmented and there are many priorities in training funding. There is substantial duplication that results from the isolation of training innovators from one another in separate organizations. Let us explain.

## Causes of Inefficiencies

In this section we begin by discussing the imbalance between today's demand for classroom training and the funding for the billets that students occupy. We also look at the installation of high-tech equipment in ships and squadrons of Carrier Battle Groups (CVBGs)

during the IDTC, and the less than optimal way in which the acquisition and training systems deal with preparing crews to operate and maintain those equipments. We discuss the War for People and the role that training plays in recruiting and retaining good people. There is more to that War, of course, and improving human performance must be the ultimate goal of the Navy's training system. But making real improvements in peoples' performance also helps in the talent war. Sailors' job satisfaction is improved when they are able to do their jobs well. Finally, in this section (and to highlight the importance of winning the War for Talent), we talk about the effect that the quality of Navy people has had, and will have on readiness.

There is no doubt that new technologies offer real opportunities for training; we write later in this report about the ways in which collaborative learning and computer-based training, for example, are revolutionizing the learning of people inside and outside of the Navy. On the other hand, advances in technology that people use, things that Sailors must maintain and operate, demand new approaches to training. It is essential that the Navy training process respond (in appropriate and effective ways) to the new training challenges presented by advances in technology. It is vital that the Navy exploit the new training approaches which technology makes possible.

The formal, schoolhouse setting dominates Navy training today. Together with their associated laboratories and electronic trainers, these facilities represent a large investment over a long period. Not only have they dominated the budgetary process, but the Navy's thinking about the delivery of training as well. Today, if leaders believe new training is necessary (because they are introducing new systems, or because they have identified a problem in the performance of Sailors), they tend to conclude that formal schoolhouse training will be required. Schoolhouses are the tried and true places to train Navy Sailors. Training requirements have been increasing and will continue to increase. New technologies and multi-tasking of platforms and people are contributing to higher demands for training. As a result, Navy leaders and financial managers are asked to fund large numbers of student billets year after year. (Student billets are the accounting category "jobs" in which Sailors are placed when they are in residence in Navy schools.)

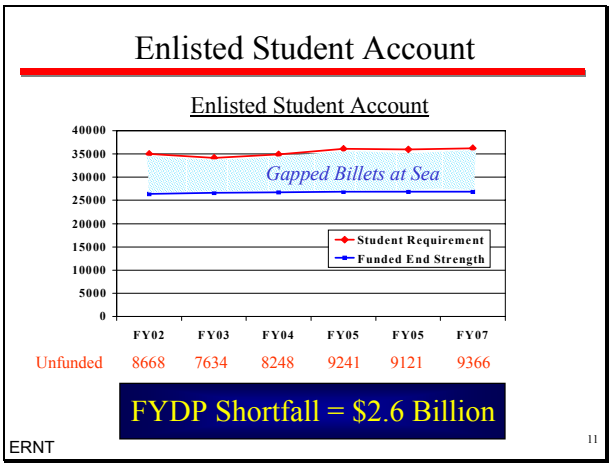


Figure 7. *The enlisted student billet account is under funded across the FYDP*

Student billets are expensive. They cost the Navy the full programming rate (of the appropriate pay grades and seniority) for Sailors who are students. Figure 7 shows the number of student billets programmed now for Fiscal Years 02 through 07. Figure 7 also shows the anticipated demand for student billets in those years. This means that, if the demand for school seats meets the forecast, there will be between 7,634 and 9,366 more students sitting in Navy schoolhouses during those years than the Navy has funded. (This disparity between funded student billets and the numbers of Sailors who are students has persisted at about this level since the mid-1990s).

But overall Navy strength for these next six fiscal years is approximately in balance. That is, the total number of billets the Navy has chosen to fund in those years (sea and shore) is approximately the same as the total personnel strength the Navy is striving for. So, failure to pay for the thousands of billets of the Sailors who will be attending school will, in an otherwise balanced personnel program, result in thousands of billets (which have been paid for) being vacant elsewhere. There are as many as

10,000 vacant Enlisted billets in the Fleet now. We contend that many or most of those billets could be filled in the future by taking advantage of modern learning techniques and technologies to reduce the need to send Sailors to residency courses of instruction. Employing options for learning (where appropriate) other than schoolhouse training will contribute to improving Fleet manning.

This change in the Navy's approach to training could improve the efficiency of the manpower and personnel system significantly. There are other areas in which training changes could contribute to better efficiency also. One is the adoption of a new training approach in the installation of high-technology hardware and software in the ships and aircraft squadrons of Carrier Battle Groups (CVBGs) during the Inter-Deployment Training Cycle (IDTC).

Figure 8 charts the profile of the IDTC installations of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) systems and upgrades in six CVBGs that have deployed recently. In spite of plans to install new technology by the middle of the IDTC, the developers and installation teams invariably find there work compressed into the last months before the CVBG deploys. Training suffers as much as, or more than, any other element of the logistics support for late installations. Personnel turnover during the IDTC compounds the problem of not having a functional system on which to train until time to deploy. The last eight Battle Group Commanders to return from deployment have cited C4ISR and Information Technologist (IT) Rating training as their number one or two training concern.

Ultimately, solving this problem will involve improvements in manning, some added discipline in the installation process, and more support for crew training and job performance. Whether or not the first two areas can be improved soon, the third should be addressed now. The Navy training establishment can improve efficiency and effectiveness of support for CVBGs greatly by adopting a mixture of media, devices and locations for training on newly installed systems. Job Performance Aids (JPAs) and Electronic Performance Support Systems (EPSSs) can serve to support and improve the performance of operators and maintainers, while continuing their learning on the job. We will continue this discussion later in the report, but we wanted to note here that persisting in old ways of training, in this new, rapidly changing environment, incurs real costs in operational performance for the Navy's fighting forces.

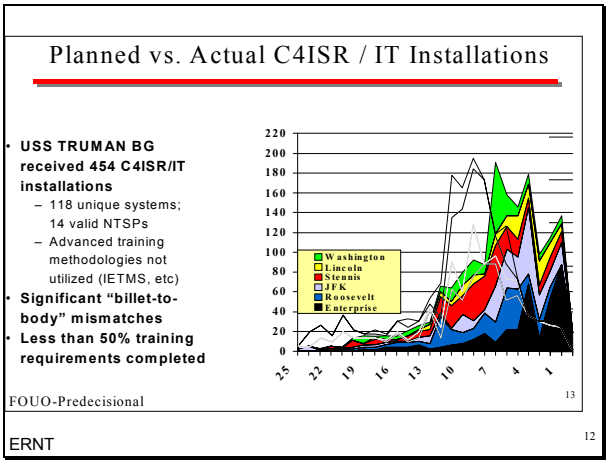


Figure 8. *Planned versus actual C4ISR/IT installations on carrier battle groups. The majority of the installations occur at the end of the IDTC leaving less time for training. Source: 2000 T&E IWAR*

## Training Organization and Funding

There are at least three major causes of inefficiencies in the Navy's training structure. First, there are many commands and organizations with overlapping and uncoordinated roles in training. Second, the funding system for training (which draws money from 11 resource sponsors into the spending plans of 12 claimants who spend the money) is fundamentally flawed. Third, the Navy's acquisition process fails to value human systems integration and the contribution of people to systems' performance.

Many of the Navy's training inefficiencies can be attributed to poorly aligned organizations. An effective and efficient training delivery system should be structured so that it can: 1) respond quickly to rapidly changing technology and requirements, 2) identify the right amounts and

delivery of training, and 3) be responsive to the Fleet. We have found that the Navy's current organizational structure is not guided by an overarching training strategy. No single organization is responsible for Navy training and education. For example, Chief of Naval Education and Training (CNET) is responsible for most of initial skills training, much of advanced skills training, but little of Officer education.

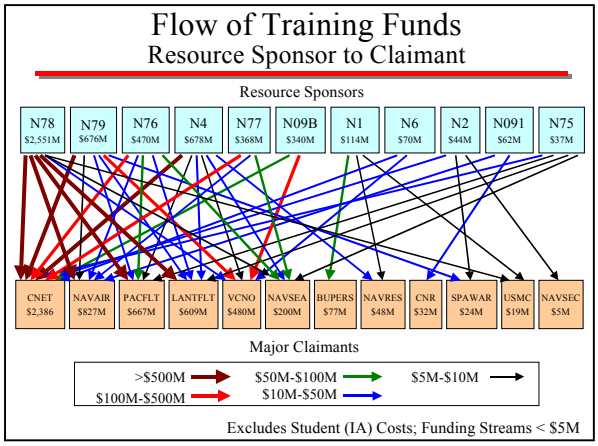


Figure 9. *Flow of training funds from resource sponsor to major claimant for FY01. Funding for training is decentralized and in some cases duplicative. Source: WINPAT database*

Funding of Navy training and education programs is similarly fragmented. Resourcing at the OPNAV level is decentralized, with programs managed by numerous owners at different levels in a complex, platform-centric environment. Figures 9 and 10 illustrate these points from both the resource and organizational perspectives. There is no rhyme or reason to the resource flow. The current tactical training organization comprises more than 38 organizations that perform management functions, 39 organizations that coordinate exercises, and 60 schoolhouses. More than 63 organizations can impose training requirements today. There is no mechanism for coordinating the imposition of training requirements. There appears to be no fiscal discipline either, as requirements often come without resources. One manifestation of this is that CINCLANTFLT and CINCPACFLT training requirements frequently differ for the same platform and missions. It is this fragmented structure that today is responsible for the training, learning, and development of our 375,000 active component Sailors and our 88,000 reserve component Sailors.

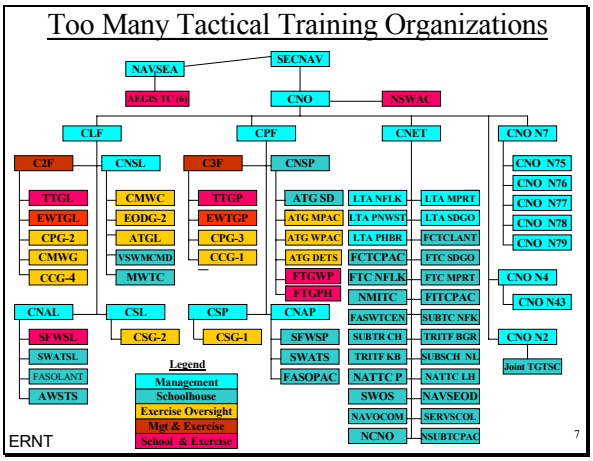


Figure 10. *Navy's current training organization is decentralized with more than 38 organizations that perform management functions, 39 that coordinate exercises, and more than 63that can impose training requirements. Color denotes activity's primary function. Source: 2000 T&E IWAR*

## Acquisition Process

In theory, training has an important place in the acquisition process. In actual practice, much needs to be improved. In early concept design, if the human interface is not adequately considered as part of the system, design problems become eventual training problems. Because advances in technology are accelerating, failure to incorporate human performance in design and support magnifies the effects. Clearly the focus early in acquisition must be on people, as well as on hardware and software.

To optimize Sailor performance and minimize total ownership cost, the warfighter must be designed as a component into the system. Manpower, personnel, and training cost trades must be coordinated with hardware and software decisions at each step of the process. When human performance has not been attended to properly in the past, requirements for manpower have grown (see figure 11) and resources for training have been wrested from other areas. The quality, quantity, and timeliness of training (and

thus the performance of the new system) have invariably suffered.

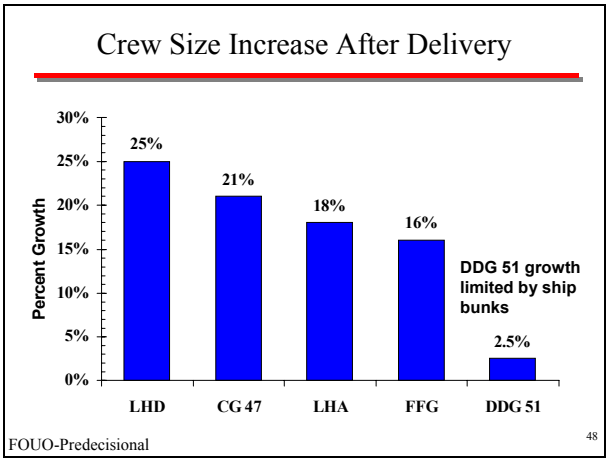


Figure 11. *Increases in crew size that occurred after initial platform delivery. Legacy platforms all required additional crew to meet work needs. DDG-51, and other more modern designs will be limited in crew growth due to space constraints.*

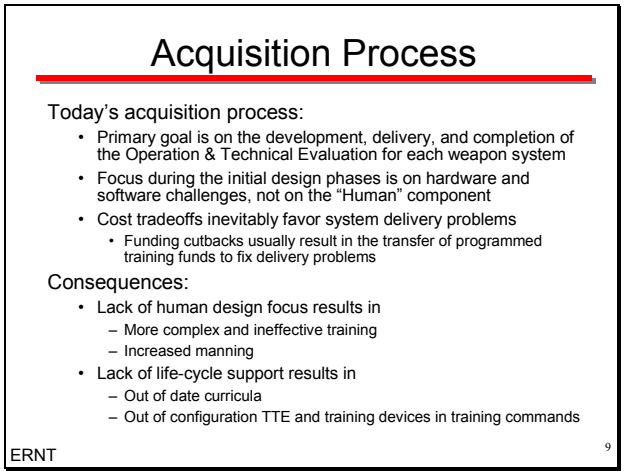


Figure 12. *Characteristics and consequences of the current acquisition process*

Early in the acquisition process, program managers, resource sponsors, trainers, and manpower managers consider training and other Integrated Logistic Support (ILS) elements (publications, tools, etc) very important. Problems occur as acquisition approaches execution. As program managers, sponsors, and industry partners have problems, trade-offs are made. ILS and training dollars often are given up to maintain a weapon systems capability or quantity of buy. Many times the result is a poorly fielded system with inflated life-cycle costs; costs that are passed to the Fleet. Sadly, these decisions are made with full knowledge of the consequences, and the burden is borne by the Fleet Sailor. The Sailor becomes the "shock absorber." Figure 11 shows some tangible consequences of choices made during the acquisition process. Increases in the size of ships' crews usually follow delivery of the ships. Some growth is attributed to errors in manpower estimations and some to choices to forego people and training to suppress costs. But crews always grow; never shrink, following ships' deliveries.

The Navy must have the discipline to ensure that training and other logistic support elements are not traded away during acquisition. Figure 12 describes again the functioning of today's process and the issues the Navy must address.

Navy instructions and directives require that program managers create Navy Training Systems Plans (NTSPs) for each acquisition program. An NTSP defines the training necessary to support the operation and maintenance of the system. The NTSP process, when properly executed, provides opportunities for the Fleet, resource sponsor, CNET, and personnel command to review and assess training requirements.

Most Navy programs have draft NTSPs at some level of detail in development as part of the required acquisition documentation. However, until the NTSP has been validated (i.e., approved by all major stakeholders and OPNAV), the process is incomplete and can become fragmented. The result may be deficient manpower, personnel, and training support. Unfortunately, in today's Navy, not all acquisition systems have a validated NTSP. Figure 13 shows the number of Acquisition Category (ACAT) IV and above systems that have passed Milestone III since 1998 (blue bars) and the number of these systems that have a validated NTSP (green bars). Overall, fewer than half of these systems have validated NTSPs. Furthermore; the chart shows that although some sponsors did better than others, no one complied with the Navy directive in all cases.

Absent a validated NTSP, new equipment often arrives in the Fleet without proper training support. This aggravates the Fleet's training challenge. The belief implicit in this approach to acquisition seems to be that training will somehow "catch up" to the fielded system; in reality, it seldom does.

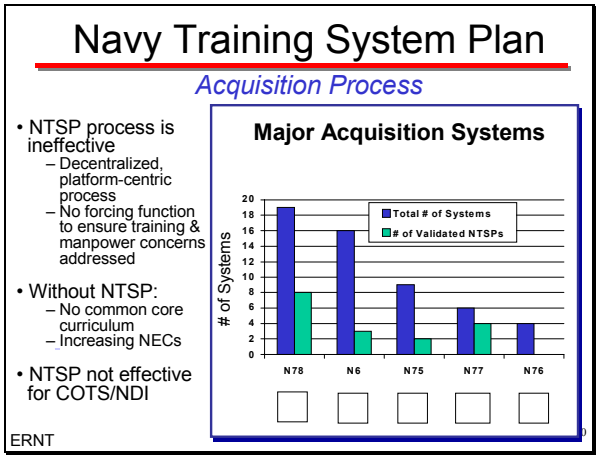


Figure 13. *Fewer than half the ACAT IV and higher system that have passed Milestone III since 1998 have validated NTSPs. Source: 2000 T&E IWAR*

The introduction and use of Commercial Off-the-Shelf (COTS) and Non-Development Items (NDI) aggregates the problem. The time to develop and deliver weapon systems (and the associated training and ILS support) is becoming shorter. On the one hand, this is a useful assault on the perennial problem of long development cycles. On the other hand, hardware and software configurations are even more likely to arrive in the Fleet before the training and support infrastructure can be put in place. The NTSP process needs to be reengineered. It must move faster to support programs that are based on COTS/NDI and other rapidly emerging technology. Otherwise, the Navy risks losing the ability to provide timely training and support for new weapon systems.

## *War for People*

We believe that the most important component of the Navy is its people. However, despite shifting to an All Volunteer Force 27 years ago, the Navy maintains a conscription mentality. This is evident in the many examples of human wastage that occur in the Navy processes for training and employing Sailors. The Navy cannot afford to continue business as usual in terms of how it relates to its workforce—the Sailors. No amount of high technology warfighting systems and platforms will replace the need for high quality, highly motivated, and highly committed Sailors. The young men and women of today demand much more from their work and from their employer than the Navy is used to providing. This must change. The young men and women that the Navy needs expect job matches attuned to their personal interests and competencies. They expect personal growth and advancement, which, along with job satisfaction, become key inducements for long-term service and commitment.

Unfortunately, growing requirements for technically savvy and experienced Sailors contrast sharply with the Navy's projected inventory of those types of people. Figure 14 illustrates the problem. The blue and green bars represent two projections of the number of enlisted Sailors in each length of service (LOS) cell over the next several years, as developed by the Center For Naval Analyses (CNA). The area under the yellow curve reflects the actual distribution of experience in the enlisted force as of the end of FY00. Choices made by the Navy during the years of the drawdown from 595,000 to 375,000 Active Component Sailors gave rise to the (temporary) abundance of experience that is represented by the area under the yellow curve in LOSs 12-19. Recruiting was reduced during the decade of the '90s to shrink the Navy's manpower with the budget. Avoiding a reduction in force (RIF) permitted the Navy to keep faith with Sailors who were serving and gaining experience, but it lowered recruiting to a level below that which was necessary to sustain the enlisted force.

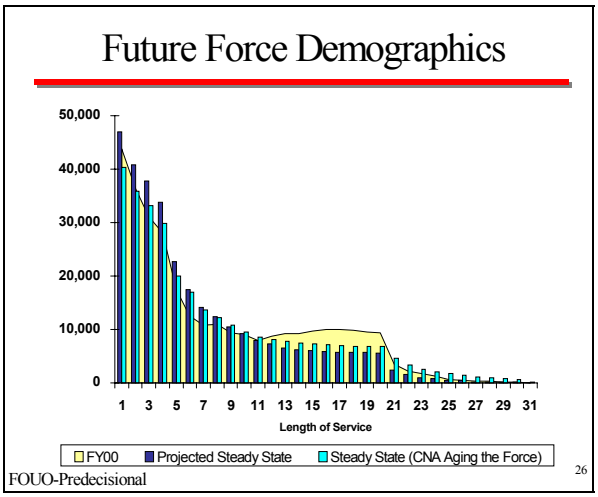

Figure 14. *Actual (at the end of FY00) and two projected length of service distributions for the enlisted force*

The Navy's inventory of experienced Sailors will decline significantly over the next decade, as the pre-drawdown cohorts of experienced Cold War Sailors continue to retire. This means that the average Sailor of today has more experience than will be the case in the next decade. In fact, the average length of service of the Enlisted force is projected to decrease by 20 percent between now and the year 2010.

The exodus of experienced Sailors means that the Navy will have increasingly to rely on recruiting and training the right kinds of young people. This is already becoming more difficult:

- The average cost of a Navy recruit has increased 64 percent from 1994 to 2000.
- The average quality of enlisted recruits has declined by almost 12 percent since 1995 (quality is defined as recruits who are high school diploma graduates and score in or above the 50$^{th}$ percentile on the Armed Forces Qualification Test (AFQT)).

In a culture where Sailors are truly valued, the Navy will care about whether Sailors are in the right career, one that matches their skills and interests with Navy requirements. Better matches would mean lower attrition and enhance job satisfaction. Today, the Navy is not organized to permit this type of job-individual match. The Recruiting Command is evaluated on its ability to meet the Navy's annual recruiting goal, almost without regard to the specific rating fill mix. The Recruit Training Command (RTC) is evaluated on its ability to produce from the recruit population Sailors who are prepared to start initial skills training or report to the Fleet.

The mismatch between Recruiting Command's and RTC's chain of command, goals, and metrics undermines a tremendous Sailorization opportunity (see sidebar). Perhaps not surprisingly, first-term attrition hovers around 40% and increased by more than 21 percent between FY91 and FY96 (the latest attrition cohort which can be tracked through its entire first enlistment). In concrete terms, the average recruiter is able to recruit just a little more than one new recruit each month and almost half of the recruiting effort is spent refilling holes created by recruits who fail to complete their initial enlistments.

The Navy's job classification process is unnecessarily rigid and ill considered. New recruits are assigned to training and career tracks that are based largely on skills assessed using the Armed Services Vocational Aptitude Battery (ASVAB)—a tool that has not changed significantly in decades—and the immediate needs of the Navy. The entire classification process is usually completed with a classifier at the Military Enlisted Processing Station (MEPS) in an interview lasting less than 15 minutes. Once a Sailor has been trained in a particular rating, there are only rare opportunities for him or her subsequently to switch ratings. This rigid process is starkly out of step with the demographic it supports. In the civilian labor force, young people (late teens and early 20s—the age group that comprises the bulk of enlisted recruits) switch jobs and careers often. As the set of bars on the left side of figure 15 shows, the typical 24-year old will hold 6 different jobs by the time he or she reaches age 24.

The Navy's initial skills training process is similarly rigid. The Navy dictates to whom, when, by what means, and where training will be delivered to Sailors. Sailors receive the types of training that Navy dictates, often without regard for their individual needs or desires.

**Recruiting Command vs. RTC**

There are conflicting priorities at work in the two commands that play the most prominent roles in recruiting and recruit training. (We will discuss only the situation for the Enlisted case here.) In a tough hiring environment especially, the Recruiting Command strives to achieve the best possible overall quality possible, while matching as many of the skill requirements levied by the Chief of Naval Personnel as the recruiters are able to find people for. If the economy is good, and the propensity of young people to enlist is low, recruiters may not be able to meet all of the constraints on the recruiting equation. The Recruiting Command also must begin the process of transforming civilians into Sailors; and while some recruits spend as much as a year in the recruiting process (in the Delayed Entry Program (DEP)), others are shipped to recruit training almost immediately. Commander, Navy Recruiting Command responds to the quotas established by his/her commander, the Chief of Naval Personnel.

The Recruit Training Command, a unit under the Chief of Naval Education and Training, is responsible for the bulk of the transformation process. It is in Boot Camp that the large changes from the civilian world to the discipline and rigor of Navy life are introduced to the recruits who become Sailors. It is here, also, that flaws in the makeup of recruits, or their preparation for training begin to show.

While both the Recruiting Command and the Recruit Training Command care fiercely about meeting their goals and supporting the operating Navy, their goals and objectives are different. Occasionally, especially when times are tough in the business of hiring and transforming people for the Navy, their goals are at odds with one another. We will argue later in this report that there should be one command managing recruiting and transformation, and one set of goals for that command: providing Sailors in appropriate numbers, with proper basic preparation, ready for the subsequent learning they will need to contribute effectively to Navy operations.

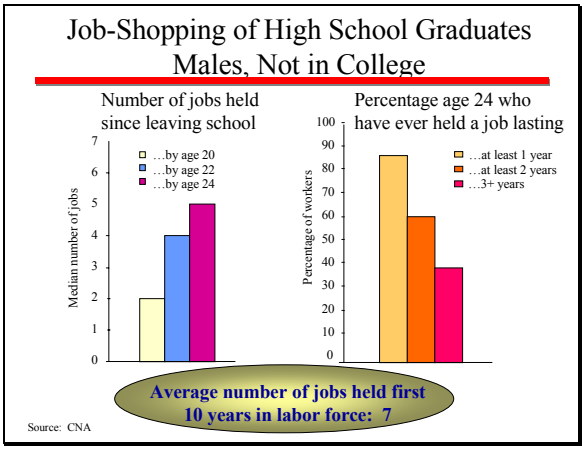


Figure 15. *A CNA study showing the high degree of job mobility and low duration of non-college bound high school graduates. Source: 2000 T&E IWAR*

It is not surprising that the Navy is struggling in its "War for People." Figure 16 summarizes the impact of the above issues from a 'supply and demand' perspective:

- Demand is increasing. Platforms, such as DD-21, are being designed to operate with smaller, but more broadly trained and educated, crews.
  - Sailors already receive more extensive training, as captured by NEC requirements. For example, E-5 Sailors in an Arleigh Burke DDG51 class ship require, on average, 39 percent more technical training than a similar cohort in the older, Spruance DD963 class ships.
  - Initial skills training requirements have also increased. For instance, from 1993 to 1996, the average under instruction (UI) time of recruits who enlisted for six years (6YO) increased by over 19 percent (12.8 to 15.2 months).
- Supply is decreasing. Competition with the civilian marketplace for quality recruits will intensify. The. Bureau of Labor Statistics predicts that jobs requiring an associate's degree (the types of jobs that are most similar to the high-tech Navy Enlisted ratings) will grow at a rate of over 110 percent relative to all jobs in the economy in the next decade. More high school

graduates are similarly seeking postsecondary education. At the beginning of the era of the All-Volunteer Force, 50 percent of high school graduates went directly to college. Today, nearly two-thirds of high school graduates will attend college immediately after graduation. In absolute terms, the number of non-college-bound high school graduates (the Navy's traditional Enlisted recruiting market) decreased by almost 40 percent between 1974 and 1999.

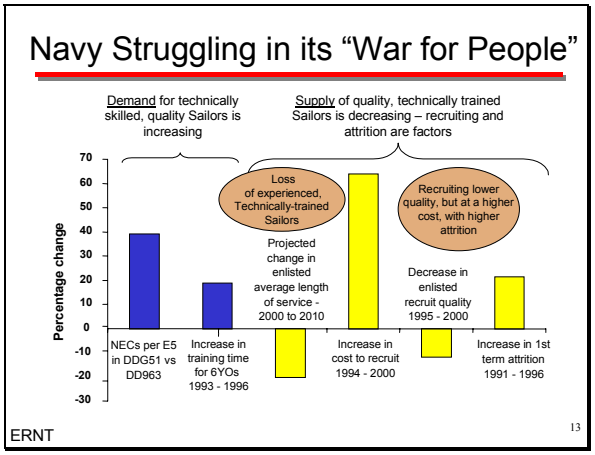


Figure 16. *Demand and supply challenges in the Navy's "War for People"*

It is extraordinarily important that the Navy attracts and retains the highest quality people. There are clear and compelling relationships between personnel quality and operational readiness. Studies have found a strong positive relationship, for example, between ship and squadron manning and traditional Navy measures of readiness. These include: aircraft mission capable (MC) and fully mission capable (FMC) rates; ship time-free of casualty reports (CASREPs); and Status of Resources and Training System (SORTS) reports. This relationship, however, extends far beyond the numbers of people assigned to the unit. Comprehensive analyses have identified specific relationships with the following factors:

- Numbers of personnel in critical ratings
- Numbers of personnel in senior paygrades
- Quality of personnel, as defined by the proportion of recruits in the upper half of the Armed Forces Qualification Test (AFQT) distribution
- Personnel turnover rates
- Proportion of personnel with high school diplomas
- Average experience levels
- Disciplinary actions.

CNA developed a measure, called the Personnel Quality Index (PQI), which summarizes the quality aspects listed above and correlates the quality of Navy personnel to readiness. The PQI serves as a rough proxy for the composite capability of the Navy's Enlisted Sailors. Figure 17 plots the value of the PQI over the 1979 to 2009 timeframe. There was a substantial PQI improvement throughout the 1980s as quality improved after the "Hollow Force" period. The increase continued through the period of downsizing in the 1990s, largely as a result of the average length of service increasing as recruiting levels were depressed. PQI peaked in 1998, and is projected to fall throughout the next decade. Two factors contribute most to this projected decline:

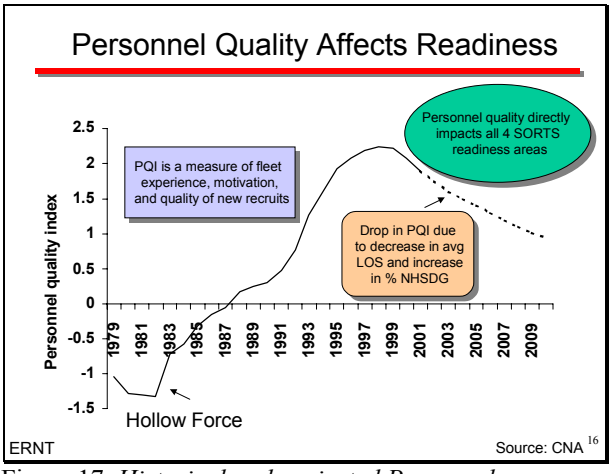


Figure 17. *Historical and projected Personnel Quality Index levels from 1979 to 2009. Source: CNA*

- The average length of service in the force will be lower as Sailors who enlisted in the 1980s reach retirement eligibility.

- Navy has been forced to respond to the competitive recruiting market by allowing the proportion of non-high school degree recruits to increase from 5 to 10 percent.

The impact of the PQI decline will be significant. Figure 18 shows the impact in four SORTS readiness areas that is predicted as a result of PQI fall-off between the peak year of 1999 and 2010.

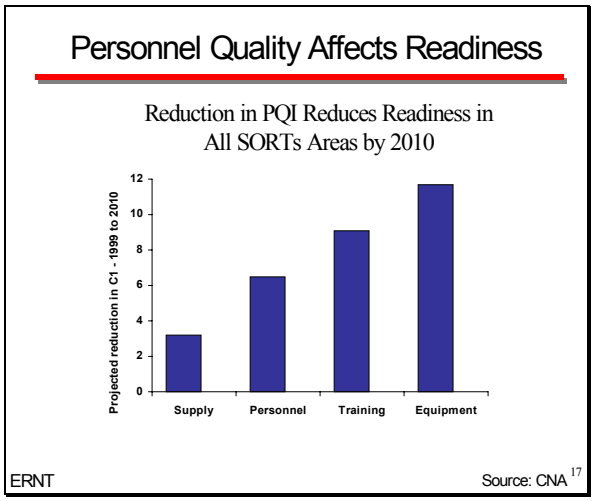


Figure 18. *The projected reduction in readiness for supply, personnel, training, and equipment in 2010 from 1999 levels attributable to the decline in Personnel Quality. Source: CNA*

## *Summary of Issues*

The demand for quality Navy manpower is increasing, while the supply of available experience is declining (see figure 19). Assuming the Navy's strength will not substantially increase, this performance deficit can only be closed by:

- Improving system design and supplying job performance aids

- Increasing the average performance of each Sailor by providing more and better training

- Recruiting higher quality people

- Retaining a higher proportion of good Navy people.

Given the projected difficulties in increasing aggregate recruit quality, and the inevitable loss (through retirement) of experienced Sailors, the only alternatives are to increase significantly the training, skills, and competencies of each Sailor, and keep far more of those Sailors in the Navy.

How then will the Navy meet the readiness challenges of the 21st Century? The Navy must win the "War for People," increasing quality enlistments and retention, and increasing the training (and performance) of each Sailor, at reduced cost. This will require a revolution in training to maximize efficiency, both in terms of processes and methodologies. The second graph illustrates closing the gap.

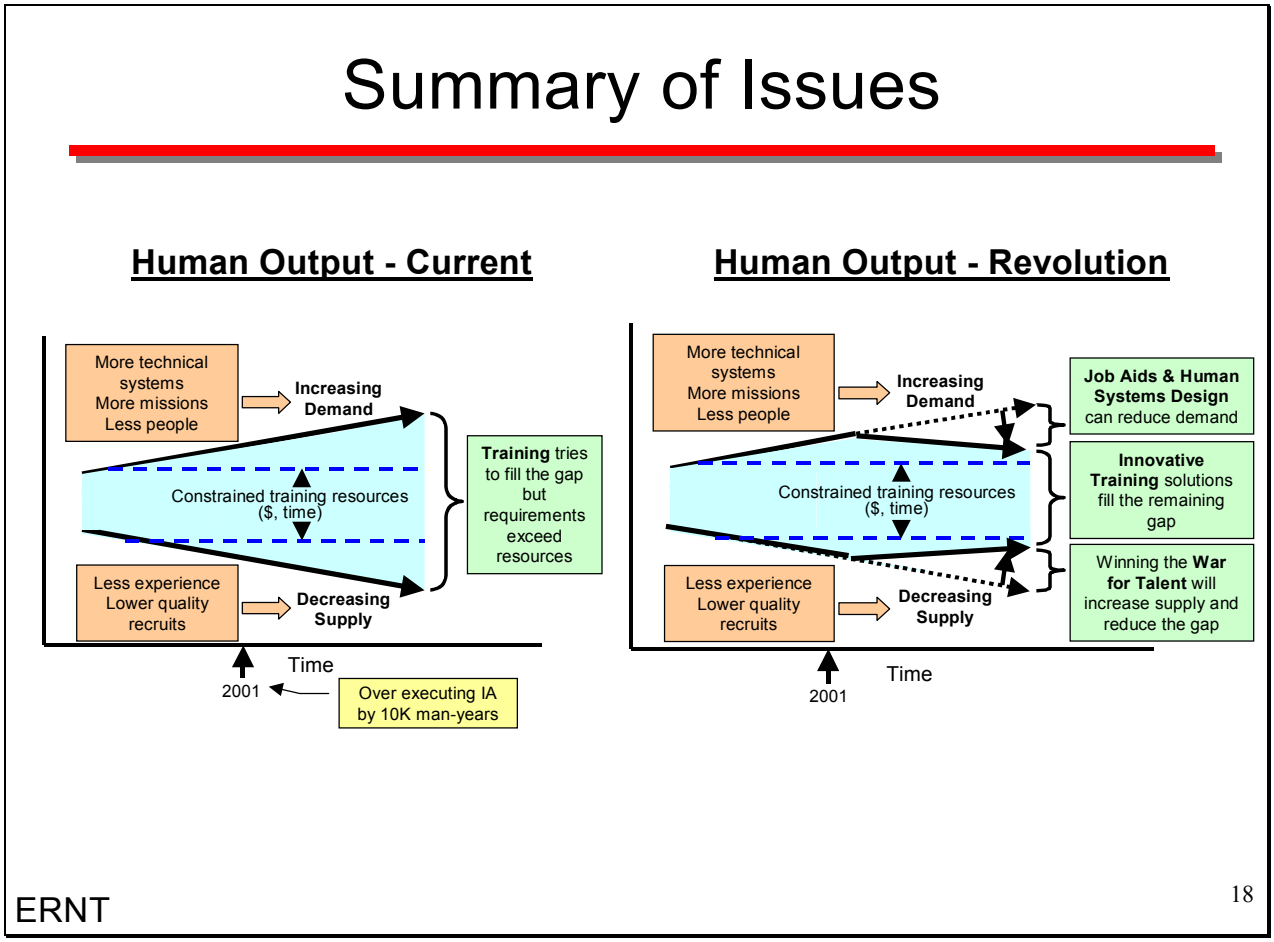


Figure 19. *Currently, the demand for human output is increasing while the supply is decreasing (left-side chart). Training tries to fill the gaps but requirements exceed resources. The goal of the revolution is to decrease the gap through a combination of human performance tools (e.g., job aids), innovative training solutions, and winning the War for People (right-side chart)*

## Total Force/Reserve Component Issues

The Naval Reserve force of today has become inextricably intertwined with the Active Component that it supports. The Naval Reserve represents 20% of the Navy's total assets and is a significant force multiplier the fleet must have to meet its global commitments. Some Navy capabilities in this Total Force, such as land-based air logistics transport (VR) and Naval Coastal Warfare, are found only in the Naval Reserve. A large percentage of other Navy capabilities, such as Seabees and air adversary units, are also found in the Naval Reserve. Naval Reservists support almost all major Navy commands, from major staffs to numbered fleets to aircraft carriers, in drill, short-term active duty, and long-term active duty status.

Within this "meshed" Total Force, many training/learning/development issues that apply to the Active Component (AC) also apply to the Reserve Component (RC). For example, current training systems cannot meet requirements either for the AC or RC. The Science of Learning focus on human performance and the lifelong continuum of learning and personal and professional development will apply equally to the AC and RC. For both the AC and RC, the Sailor must view any changes as helping him/her; COs must see this as "value added;" eLearning must be of the highest quality; and worldwide "pervasive" access is essential. We discuss the specifics of these recommendations in section IV of this report

More importantly, the AC determines training requirements for the RC by specifying the type of support desired from the RC. It is the AC that determines what capabilities the RC units and personnel must have, as well as when and where those capabilities will be provided.

There are, however, certain challenges that are more critical for the RC than for the AC.

- The majority of Selected Reservists (SELRES) work full-time civilian jobs and have families, in addition to fulfilling their Navy responsibilities. The typical SELRES continually performs a juggling act—balancing time requirements for family, Naval Reserve, and civilian job. For them, time to train may be even more difficult to find than for members of the AC.

- The basic annual active duty period available to a SELRES is two weeks. This is too short a period for completion of many traditional schoolhouse-training courses. In further competition for SELRES time, the AC "gaining commands" expect and demand that the SELRES spend their active duty time providing support to that command.

SELRES live and drill across the country. Although many SELRES live and work in Fleet Concentration Areas (FCAs), even more live in our country's "heartland," some distance from the FCAs and traditional Navy training facilities. In many areas (e.g., Montana, North Dakota or Idaho), the only Navy presence other than recruiters is provided by SELRES who live and drill locally. Access to schoolhouse training is even more difficult for these SELRES than it is for the AC. However, they still are expected to be fully trained when they report to Fleet units to provide support.

In Section IV we will recommend changes in process, attitude, organization, resourcing, access, and other important aspects of Navy training. As important as those changes will be to members of the Active Component of the Navy, they will be at least as important to the Reserve Component.

# What We've Learned

In this section, we present what we have learned in our research, discussions, and analyses to best address these problems. We examined lessons from prior Navy training reviews and reorganizations to understand what has worked and not worked in the past. We asked Sailors what was important to them and also learned about current Navy practices that are models of training success. We turned to industry to find best practices; approaches that have worked there in meeting many of the same challenges the Navy now faces—a tight labor market and rapidly changing technology.

## *What We've Learned From History*

The Navy has reorganized its training establishment five times since 1971. It has also conducted numerous studies of its training organizations and functions during the same period. A common thread in all of the reorganizations and studies was a belief that Navy training, management, and organizations could be improved to better formulate and implement learning. Many of the studies concluded that there should be a single organization/commander in charge of Navy training. A number of the reorganizations attempted to accomplish this but fell short of that objective.

We focused our historical review on four major studies/reorganizations that had significant, actual, or potential impact on Navy training management: 1971 *Cagle Report*, 1976 *Salzer Report*, 1992 *OPNAV Reorganization*, and 1999 *NRAC Report*.

The common theme in all the studies is that Navy training is not organized to deliver training efficiently and effectively at either the fleet or the individual level. No clear lines of accountability and responsibility have been established. Previous reorganization attempts have failed to provide a strong centralized approach to training management. Figure 20 reiterates some of the lessons from the previous attempts at reorganization.

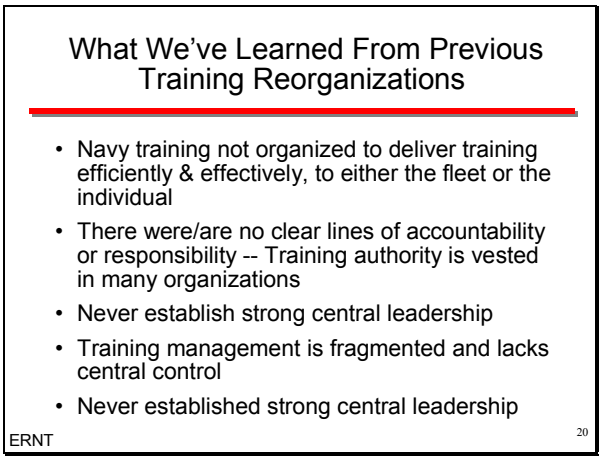


Figure 20. Some l*essons from previous reorganizations*

We believe that previous reorganization and study efforts did not achieve their goals because they:

- Did not produce a comprehensive approach
- Focused solely on schoolhouse training, thereby ignoring fleet training
- Never established strong central training leadership and/or management
- Focused on organization, not outcomes
- Ignored the training roles of the System Commands (SYSCOMs)
- Did not create a single training and education spokesman for POM, budget, and execution
- Failed to build an organization that could seek and respond to new technologies
- Could not build consensus
- Did not correct bureaucratic layers that expended resources with little apparent impact on training outcomes.

Still, we agree with the principal findings of these studies. The outcome the revolution must

be an organization that will reflect the values of the individual while satisfying the requirement to provide trained sailors to the fleet. This organization must be strong in leadership to put into place a new training/learning continuum. It must also maintain a "line of sight" between its customers and the issues that are most important to them. Bureaucratic layering and a "headquarters knows best" mentality cannot be allowed to separate the strategic focus of the Revolution from its fundamental roots—the Fleet.

## *Sailor Interviews*

The ERNT conducted interviews with Sailors to assess some specific issues related to Navy training. To do this, we selected people from a variety of units, including Recruit Training Command, Fleet Training Centers, and operational submarines, ships, and aircraft squadrons. In all, we interviewed 202 Sailors from 19 commands, ranging in rank from Seaman Recruit to Captain. The survey was not designed to be statistically valid; instead, we were interested in getting a sense of what Sailors from different parts of the Navy thought of the state of Navy training. Figure 19 lists some of the results of the interviews.

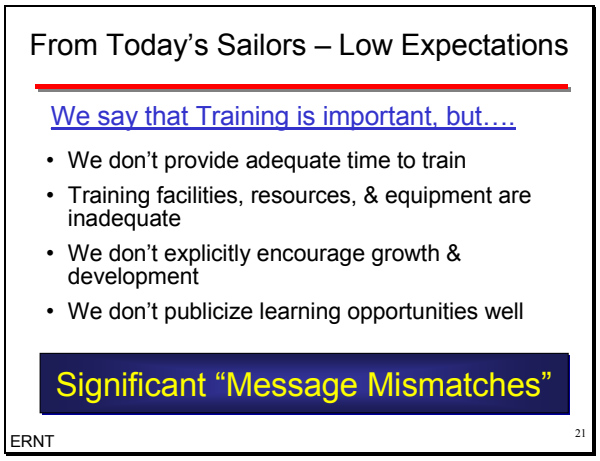

Figure 21. *What we learned from Sailors*

The first series of questions we asked pertained to Sailors' expectations for training. In particular, we were interested in finding out whether Sailors' expectations for training and education were being met. Sailors told us that their expectations for training were generally being met, although we were dismayed to find that they had fairly low expectations for both training and education to begin with.

Sailors also reported that their most positive learning experiences in the Navy were attributable to high-quality instructors, ample hands-on practice, and relevant content. Likewise, the majority of Sailors said that they would improve Navy training by adding opportunities for practice, upgrading training equipment, providing more high quality instructors, and increasing the use of technology in training.

### Opportunites

A sample conversation with a Third Class Sonar Technician is useful in explaining some of the challenges of training onboard ship. The interview (like all the 220 interviews) was one-on-one with an ERNT team member, and lasted for about an hour onboard the Sailor's command. In the case, the command had made a tangible commitment to training: the first one and one-half hours of every day, fours days a week, would be devoted to training.

"So," the Third Class Petty Officer was asked, "how do those training sessions go, and do they help you with your job?" Her answer was, "Not well, and not very much." The problem, its seems, is that there are few tools (at least modern, sophisticated tools) at hand even in this (state-of-the-art) front line ship to support learning in the work center. The learning experience for this Sailor and her shipmates often consists of sitting cross-legged on the diamond tread (electrical insulation matting) and listening to a person from the work center read from a technical manual. The interviewer was struck by the opportunities here: the chance

Sailors also reported several important obstacles to learning. Of these, lack of time was (by far) the reason most often cited for training and education being difficult or impossible to accomplish. In addition, Sailors told us that personnel shortages, inadequate facilities and equipment, and low priority by their commands were obstacles to learning. With respect to educational opportunities, Sailors reported that availability and access to courses were most in need of improvement. Several also commented that publicity for educational opportunities could be improved so that Sailors would know what was available.

We asked several questions of the Sailors with the sample who were also supervisors (there were just under 90). To begin with, a majority of supervisors reported that newly reporting Sailors do not have the skills to do their jobs. Perhaps more disturbing was the fact that two-thirds of these supervisors reported that they could not get required training for their subordinates. For the most part, they attributed this to lack of time and courses, and to manpower shortages.

Finally, the majority of the Sailors who had been exposed to technology-based training (about 175) liked it. However, the majority also reported that they preferred situations that included human instructors in addition to computer-based training.

## *Islands of Excellence*

There are many institutions within the Navy today that provide the Fleet with effective, responsive, and flexible training. Most were mentioned by Sailors in interviews; others we found on our own. In some cases, these "Islands of Excellence" exemplify many of the qualities that we feel are indispensable characteristics which must be embodied in a successful Revolution in Training. The Navy must identify, study, protect, and incorporate the successes and attributes of these (and possibly other) "best practices" into the implementation phase of this Revolution.


Figure 22. *Examples of effective Navy training programs*

Here are the nine examples (shown in figure 22) that we have the room to include. In each case, we have chosen them because they embody features that are instructive for the implementation of the Revolution in Training. Here they are, with some of their relevant attributes.

- Naval Strike Air Warfare Center (NSAWC) and the Air Combat Training Continuum (ACTC). A professional, highly valued training center managing and delivering an aligned, end-to-end training process for combat aircrews.

- Aegis Training and Readiness Centers. A customer-focused waterfront support organization that senses the needs of Aegis combat systems operational teams and maintenance teams for technical and other logistics support. Responsive to Commanding Officers and Leading Petty Officers alike.

- Submarine School New London. A training center that has made substantial progress in incorporating advanced technology and practices into what was an ordinary Navy training place. Among many possible examples: migrating all SUBSCOL courses onto SUBNET/SIPRNET. Advances have been made in spite of the state of training funding and organization today. Although SUBSCOL is a CNET activity, it receives

substantial guidance and resources from the submarine TYCOMs and N779.

- Local Training Authorities (LTAs). A CNET initiative, LTAs are "one-stop" training brokers in Fleet Concentration Areas; specialize in traditional and non-traditional training solutions for Fleet ships, submarines, aircraft squadrons; LTAs' reach extends into the commercial marketplace for solutions.

- COMTHIRDFLEET (C3F) Inport Tactical Team Training. With Fleet Combat Training Center, Pacific (FCTCPAC), C3F is developing tailored tactical training broadcast to ships in port or underway. If ships' tactical facilities are unavailable (due to maintenance, for example), FCTCPAC provides virtual command and control facilities. FCTCPAC has new, "additional duties" responsibilities directly to Commanders of Third Fleet Battle Groups in training.

- Nuclear Power Training. Naval Reactors took advantage of the move of Nuclear Power School to Charleston to advance both technology for and learning environment of students. Strengthened connections with Fleet submarines and nuclear powered aircraft carriers. Tailored training to learners and sharpened metrics with which to measure effectiveness of training.

- Interactive Multi-sensor Analysis Trainer (IMAT). Embodies extraordinary graphical representations of complex concepts and physical phenomena in training operators in undersea warfare. Began as tool for aviation acoustic operators, expanded to submarines and surface ships. Used in "A" school and also in the Fleet for training, briefing/debriefing, and performance improvement. Used as well by commanders as a tactical decision aid.

- Collaboration at Sea. Assembled quickly (42 days) for a CVBG deployment by an IBM Corp. and Navy team. Processes and procedures then developed "on the fly" during the Battle Group's deployment. Became the preferred intra-Battle Group information/knowledge management and exchange medium.

- Battle Stations. The rigorous event late in Recruit Training which gels the learning material up to that point and focuses Recruits' attention on the transformation that they, and their fellow Recruits are undergoing. Builds teamwork in a somewhat realistic environment of crisis. A good start, and an opportunity for early application of dramatically improved simulation to enhance realism and improve the experience and value for Recruits.

- Fleet Partnership Feedback Program. At Fleet Training Center (FTC), San Diego and FCTCPAC some individual and team graduates are "tagged" and followed for assessment in the Fleet. Graduates' performance is tracked through interviews aboard their ships/squadrons and with feedback from supervisors; tracking lasts as much as a year following graduation.

These "Islands of Excellence" demonstrate something of the creativity being exercised today by individuals and commands in the training establishment. There is much more, and we only scratched the surface. We recommend that the Implementation Team use these, and others they may uncover, as examples on which the changes and innovations of the Revolution can be built.

## *From Industry and Academia*

Industry faces many of the same challenges that the Navy faces, particularly in terms of attracting and retaining a quality workforce, and keeping pace with rapidly changing technology. While industry generally has more tools available to hire and retain good people, many companies have faced challenges in preparing employees to meet their business needs, particularly in terms of information technology. Competition has forced organizations to be

innovative in their attempts to keep the training of their workforce current in the face of fast paced technological innovations. Businesses that specialize in IT solutions face particularly strong competition. As a result, increasingly cost-effective training and human performance solutions are required to maintain competitive advantage. While the Navy's bottom line is not the same as in the private sector, solutions developed in industry hold great promise in helping the Navy to become more cost effective and efficient in providing training and other human performance support tools. We devoted a good deal of time to studying best practices in industry, gathering ideas to use as a basis for formulating our recommendations for the Navy.

Besides applying lessons learned from industry, we also recognized that much research has been done over the years into how people learn and perform various tasks. Although academic institutions have done most of this, much of it also was sponsored by military research organizations. Collectively, this literature provides a solid foundation upon which to base an understanding of training and performance-enhancing solutions.

The following sections discuss what we learned from industry and academia. The first section addresses broader human performance issues, followed by a discussion of the science of learning and measurement in training. Finally, we close with a brief discussion of organizational learning.

## Human Performance

Human performance is the aggregate influence of all factors that result in a person achieving a desired level of job/task performance. Many top-flight organizations have recognized that optimal performance can only be realized by considering people as a central mechanism for achieving their goals. The notion that people are an organization's most important resource may seem obvious. However, until recently many organizations have emphasized the development of systems they believed would meet performance needs and paid little attention to the people who had to make them work. Virtually every organization we visited (or researched) has begun to recognize that job performance and, ultimately, the bottom line are functions of what employees know and how well they apply that knowledge in accomplishing their jobs.

To aid in this new way of thinking, many organizations are turning to the field of human performance in the workplace, a subject of academic study for most of the last century. Personnel psychologists and others who study performance in the workplace have sought to understand how to optimize task performance and organizational functioning. The fundamental concept upon which this science is based is the notion of *competencies*. A person's competencies can be defined as the knowledge, skills, and abilities (KSAs) that he or she brings to the job. *Knowledge* in this case is defined as the underlying rules, facts, relationships, procedures and vocabulary that support effective performance. *Skills* are defined as the person's capability to execute an appropriate sequence of behaviors—essentially the ability to actually perform the task. *Abilities* typically refer to the person's propensities, that is, his or her innate preferences, talents, strengths, attributes and aptitudes.

More modern conceptions of competencies also add job-related *Attitudes* as an important characteristic of the performer. A good deal of literature indicates that when employees have appropriate attitudes toward their jobs and organizations (in addition to other KSAs), they perform better. In addition, some conceptions of competencies also include *Tools* as an important ingredient. In this context, tools can be thought of as all of the external aids that help the person to perform his or her job.

The logic of work psychology marries this concept of competencies with job requirements. It recognizes that the fundamental mechanism for optimizing performance is to understand, in a detailed and comprehensive way, how the task or job is to be performed. Typically, a job or task analysis (sometimes referred to more broadly as a needs analysis, which also includes an assessment of the competencies existent in the workforce) is conducted to determine the

specific tasks to be performed. From the task lists (which also specify the conditions under which the tasks are performed), analysis is completed to establish the competencies required to successfully perform the task. Once competencies are delineated, a gap analysis is performed (i.e., to determine where shortfalls in the current workforce exist) and interventions, such as training, are then developed to provide needed KSAs to the workforce in the most efficient and effective manner.

It is also important to note that the issue of human performance—as it relates to the workplace—has much more to it than just training. In fact, there are many ways that organizations can intervene to ensure that employees have the appropriate competencies to do their jobs. Fundamentally, ensuring that performance is optimized begins in system design, when attention to human factors can have a huge impact on the ultimate ability of people to employ those systems. Performance support systems, which seek to provide operators with the knowledge they need to perform their jobs *as they are working*, are becoming increasingly popular. Modern technology is increasing our ability to provide information in real time to support performance.

In addition, there are other people-related interventions that help to ensure that employees are prepared fully to accomplish their jobs: most notably selection and classification. The better the organization is able to match the person's innate competencies to the job, the smaller the investment required in training and development. A Sailor-centric approach by the Navy must consider recruits' and Sailors' interests and desires as a basis for job placement.

Finally, when training is the appropriate intervention, technology offers a host of non-traditional training solutions. While the tried-and-true method of using a bright, motivated instructor in front of a classroom will always be best for some purposes, other solutions like web-based instruction have greatly expanded the toolbox available to trainers. Techniques such as intelligent tutoring, which rely on automated models of instruction, are already producing good results in the private sector. Automated tools to aid the on-the-job-training process, such as on-line performance assessment and diagnosis, are now being fielded in industry. It must be noted, however, that technology is not the solution to training challenges; it is simply an enabler. The *Revolution in Training* will be as successful as the soundness of the scientific foundation upon which it is built. The science of learning is paramount to our discussion of human performance and training.

## Science of Learning

The science of learning has been the focus of a rapidly growing research field over the last three decades. At its core, the science of learning seeks to understand how individuals and teams come to acquire the competencies needed to perform their jobs. Theorists have identified basic principles of knowledge and skill acquisition, and have determined how to maximize the transfer of learned competencies to the job. The long-held notion that 'telling is teaching and listening is learning' does not recognize what researchers now understand: individuals retain knowledge best when they learn theory while applying it; individuals internalize complex information at higher rates when they learn it in a collaborative environment, and learning is maximized when organizational structures are aligned.

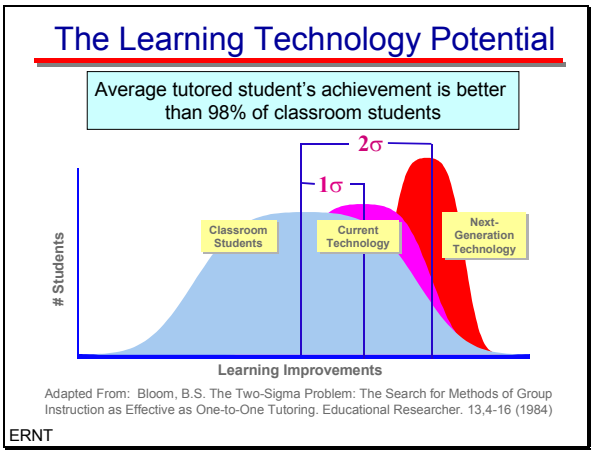

Figure 23.

The science of learning provides great insight upon which to build effective, efficient learning systems. To begin with, research demonstrates

that when students are tutored—that is, they receive individual attention—learning can be improved by up to two standard deviations when compared with group-based instruction (see figure 23). This is because individualized instruction can be tailored to the student's unique needs and level of mastery. In the past, human tutors have performed most tutoring. In the future, technology has the potential to provide viable computer-based tutoring systems. Specifically, intelligent tutoring systems—those that track student progress and tailor feedback and remediation—are beginning to appear. This does not mean that intelligent tutors will replace human instructors; rather, we will use technology to augment the instructional process so human instructors can focus on higher-order skills where their expertise is most needed.

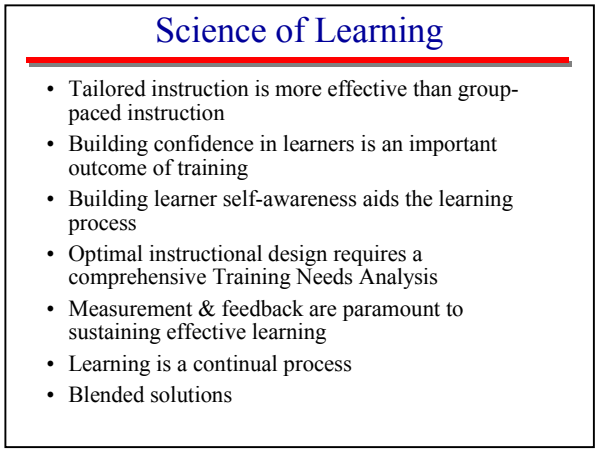


Figure 24. Some p*rincipal tenets of the Science of Learning*

Other findings from the research literature indicate that motivation is an important factor in learning. Quite simply, motivated students learn more than unmotivated students. Moreover, factors that motivate students include: relevance of the material (particularly for adult learners who are much more motivated when they understand *why* they are learning something), and the degree to which the training can help the learner obtain valued outcomes (e.g., promotions, effective performance). Learners are also more motivated when they are engaged in the learning process (e.g., through hands-on practice, discussion, etc.).

Another factor that is crucial to learning is confidence. Learners may acquire the knowledge and skill, but not have the confidence to apply those skills on the job. In addition, learning is improved when learners are taught self-awareness in the learning process. This means that it is important to teach learners how to learn. Research shows that learners who are aware of their own mastery in the learning process are better able to diagnose their own needs and to direct their own learning process.

It has also been shown that measurement and feedback are paramount to the learning process (this will be discussed further in a subsequent section). Measurement during learning allows the learner to assess the level of current mastery; it also provides information about the way ahead. Targeted feedback, which focuses the learners' attention and gives them information on how to improve their learning in subsequent instruction, can then be provided.

Another line of science of learning research has to do with transfer of newly acquired knowledge and skill to the job. Transfer of learning is a complex process that depends on factors outside training itself. Such factors include: providing ample time for practice on the job so that newly learned skills are reinforced; providing a climate for learning on the job so that learners can continue to hone their skills; and providing supervisor and peer support for newly learned skills. All of these factors share a mutual dependence that is the genesis for *a culture of learning*—a continual learning process on the job. Modern organizations have recognized that such a culture is essential if employees are going to keep pace with complex, changing work environments.

## Measurement in Training

It is not an overstatement to say that measurement is paramount to learning and to optimal organizational functioning. Without measurement, it is impossible to determine how well employees are doing, or what needs to be done to improve their performance.

Figure 25. *4-level assessment model*

Unfortunately, measurement is most often ignored. The trend in modern industry is to treat training and human resources as parts (albeit important parts) of the business strategy. As such, it is incumbent upon the training function to show value as it relates to the bottom line. Several organizations we visited reported that they are building measurement systems to assess the quality of their training and the return on investment it provides.

Measurement in training has been dominated by a single model proposed by Kirkpatrick in 1959 (see figure 25). This model holds that there are four levels of measurement that must be included in a training measurement system. These levels increase in complexity and provide unique information useful to the organization. They are defined as follows:

1. *Reactions*—includes questions such as: did the learner enjoy the learning, did he/she find it interesting, did he/she find it relevant to the job, can he/she see how to use the training to achieve desired outcomes (e.g., promotions). It should be noted that simple reactions—i.e., asking people whether they liked the training—are not very useful. In fact, even when people report that they like training, they often don't learn anything. Unfortunately, reaction measures are relatively quick and easy to collect so they are most often the only measure obtained.

2. *Learning*—addresses whether the learner acquired the fundamental knowledge needed to accomplish the job. This includes such things as the fact, rules, procedures, principles, relationships and vocabulary required for performance. Learning can be measured in several ways. Typically, paper-and-pencil tests are used to assess cognitive mastery. While these are good indicators for some aspects of performance, they generally cannot predict whether a learner has also acquired the necessary skills to do the job.

3. *Behavior*—concerns itself with whether the learner has acquired the skills to actually perform the job. In order to assess this level appropriately, some sort of work sample test (i.e., actually requiring the learner to demonstrate that he/she has acquired the skill) is necessary. As noted above, many factors outside the training itself will influence when and how a learner will apply newly acquired competencies to the job. It is not enough to simply measure post-training behavior at the completion of learning; it is also necessary to measure learners in their actual work environment whenever possible.

4. *Results*—refers to whether or not the organization actually achieves its desired objectives as a function of training. If training is initiated to improve safety, then this level of measurement would seek to determine whether accident rates have decreased as a function of training. Organizations often have uncertain or diffuse goals for training, so that an assessment of results is difficult. Our industry partners reported that this situation is changing, as training is increasingly becoming a business case. In the future, organizations—both public and private—will have to show that investments in human capital are paying off, along with investments in other parts of the business.

## Organizational Learning & Change in Industry

All organizations—in one way or another—must transform information into valued knowledge. The term *organizational learning* refers to the

pattern of actions, individuals, symbols and processes that enable this to happen. This process of transforming the 'how' of its functioning is supported by five distinct subsystems in an organization--learning, organization, people, knowledge and technology. These subsystems are connected, mutually dependent, and must be flexed in order to maintain competitive advantage. Organizational learning is highly dependent upon the dynamic social forces within an organization. It builds on past knowledge and experience of employees and also on the organization's collective memory. Hence, institutional mechanisms are combined with the shared insights, knowledge, and experiences of the organization's members to create a climate to support learning and continual improvement.

Organizational learning is not a means to an end, but a continuum in which the behaviors that define learning and the behaviors that define "being productive" are one and the same. Learning is the heart of productive activity, so much so that it has become a factor of production as the new form of labor. But in order to optimize performance, organizational mechanisms (policies, practices, procedures, structures, alignment) must support the human part of the system. Specific Navy examples of alignment of processes into an effective organizational learning pattern of operations might include: elimination of an up or out policy, restructuring the competitive nature of promotion and advancement, selection of recruits for their talent vice the needs of a particular rating, placement of Sailors as a function of their talent and interests vice the needs of the distribution process, elimination of mandatory time served for advancement to the next rate, and use of demonstrated competency in required skill sets as a basis for advancement and promotion.

Many enterprises in the last decade have attempted to build learning organizations by making significant investments in technologies for sharing information and knowledge. Yet most have neglected the how and why of employee learning. They tend to seek only the quick win, invest in the latest trend, or focus on tools such as 360 degree feedback, mentoring, and updated training programs when they need, as well, to be zeroing in on developing and growing a learning culture. The interrelationships and integration of an organization's subsystems and processes, as defined by its policies and actions (i.e., 'walking the talk') are crucial if knowledge development, recognition, sharing and ultimately learning is going to occur.

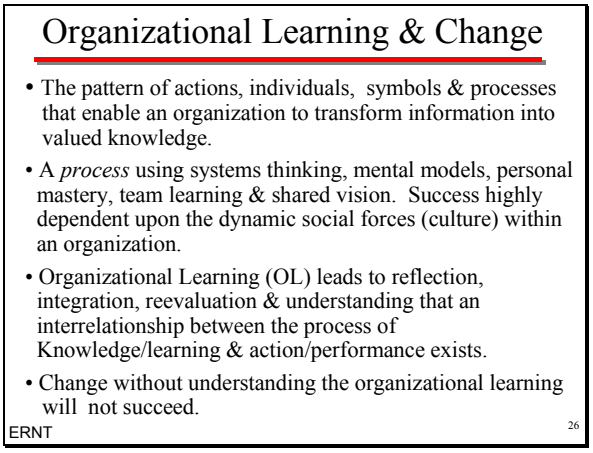

Figure 26. *Characteristics of organizational learning and change*

The *how* of implementing the changes is just as critical as the *what*. The truly empowered learner is a manifestation of the learning organization

## *The War For Talent*

In this section, we present what we've learned from industry, academia, and research concerning the role of training and education in attracting, recruiting, retaining, and enhancing the careers and productivity of workers. We start with a summary of industry and Navy research findings (see figure 27).

As we said earlier, in this competitive labor economy, employers are increasingly realizing the need to treat investments in human capital as a business strategy. Indeed, they realize that their investments in their employees improve their overall productivity and profitability. Currently, about one-third of CEOs' time reportedly is spent in efforts to retain employees. The leading edge companies state that their goal

is not to keep employees employed, but "employable." In other words, if employees feel that their skills are constantly being updated and they are receiving the best training available anywhere, they know that they are employable. In this economy, that means finding a new job with little or no difficulty. But why leave a company that maintains your technical currency, as long as other working conditions are good? And for the employer, maintaining employees' skills means that the company will continue to be on the cutting edge and competitive.


Figure 27. *Some of the major lessons we learned from industry*

A large part of the training revolution in the civilian workforce, what has enabled companies to offer more training while still holding down costs, is their increasing use of eLearning. This has enabled corporations, many of whom have widely dispersed workforces like the Navy, to offer training to their people at minimal costs, as we discussed in a previous section.

## About Recruiting & Retaining People

What do we know about the role of training and education in the war for talent? As we stated earlier, the economy has presented all employers with challenges similar to those of the Navy. This has lead to real changes in the workplace. Employees have new expectations, particularly in terms of education and the role of work in their lives. Employers are meeting the challenges by rethinking the entire range of things that employees value in their work. Managers are striving to be employers of choice.

**Recruiting** Factors that improve recruiting are similar to those that increase retention—they include pay, benefits, and other quality-of-life issues. The following are some statistics relating to Navy recruiting in particular, and significant trends in the plans of recent high school graduates—the Navy's largest source (90 percent) of enlisted recruits.

CNA recently conducted a survey of high school students to analyze the impact of recruiting incentives on propensity to enlist. The results indicated that those who are moderately inclined to enlist—the college-bound high school students—respond positively to offers of shorter service obligations and college-related incentives. Those who are already more highly inclined to enlist are attracted less by these types of incentives.


Figure 28. *A smaller percentage of Navy enlisted personnel earn an associate's degree than their Air Force and Army counterparts*

Consistently throughout the past several years, new recruits respond that their top reasons for joining the Navy are: skill training, money for college, travel, and to continue their education. From the 1999 New Recruit Survey, 46 percent responded that money for college, or to attend college while on active duty, were in their top three reasons for joining. Eighty-four percent said that they planned to work on a college degree during enlistment. Yet, in spite of their stated intentions, only about one-half of one

percent of enlisted Sailors earn an associate's degree each year, as illustrated in figure 28. Although intentions are fairly comparable in the other services, Airmen are eight times as likely, and Soldiers four times as likely, as Sailors to earn an associate's degree on active duty.

**Retention**. Factors that make an employer desirable for job seekers are similar to those that make workers want to remain with that employer. What in particular do employees want in their work? The following is a summary of findings from a variety of sources.

An American Society for Training and Development (ASTD) publication, *Recruiting and Retaining Employees: Using Training and Education in the War for Talent*, summarized findings from several studies.

- A 1997 Society for Human Resource Management survey on retention practices found that 85 percent of employees who left their employer did so because they were not receiving the career development they wanted.
- A 1999 Kepner-Tregoe report found that the top three reasons employees left their employer were lack of financial rewards, recognition, and career development.
- A 1997 Saratoga Institute survey listed the following items as a way to make an organization a "good place to live and work":
  - Employee job opportunities (career development)
  - Work/life balance (quality of life and a family-friendly environment)
  - Employee/employment principles (self - esteem and responsibility)
  - Compensation and benefits
  - Management (communication and philosophy)
  - Work environment (flexibility)
  - Organizational culture (learning and caring)
  - Company success and quality.
- A 1999 American Management Association survey found that of the top ten retention tools, technical training was #1, employability training was #2, tuition reimbursement was #4, and company support for degree was #6.
- A U.S. Department of Labor 1996 study found that employer-based training was associated with lower turnover.
- A 1994 ASTD study found that 57 percent of firms offering education programs reported that it had a significant, positive effect on loyalty to the company.
- The January 2000 International Foundation of Employee Benefit Plans (IFEBP) report said that 88 percent of the 101 employers surveyed stated that educational benefit programs were a useful tool for retaining employees.
- Of 1,500 employees surveyed by Towers Perrin in 1999, 72 percent responded that training was important.

We have specific data on the effects of education on retention in the Navy. A 1998 study conducted by CNA found that Sailors who participate in VolEd while on active duty have, on average, 13-percent higher retention than those who do not, after controlling for relevant factors, as illustrated in figure 29. The more credits earned, the higher the retention, all else equal.

All of these studies point out the key role that training, education, and career development play in recruiting and retaining quality people.

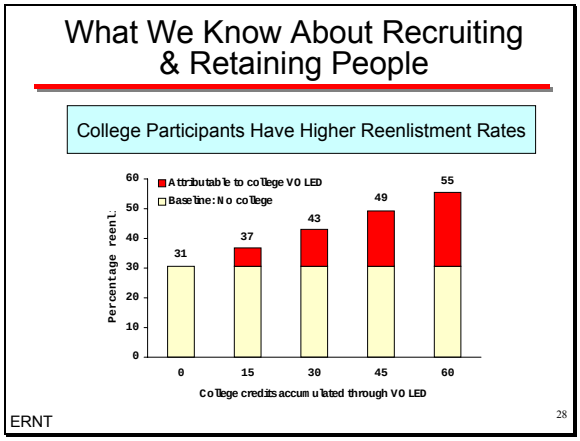


Figure 29. *Enlisted Sailors who participate in college education programs (e.g., VolEd) have higher reenlistment rates. Source: CNA*

## *What We Have Learned About Technology, Learning, and Change*

The ERNT team visited leading American industries, Navy laboratories, and institutions of advanced learning, and reviewed the current literature and business thinking to appreciate how "leading edge" organizations are dealing with technology, learning, and change. These site visits, conferences, and benchmarking efforts were key to understanding the corporate strategies and enterprise solutions that are being applied by agile organizations expecting to succeed in the 21st Century.

Our discovery efforts revealed several common themes as these organizations struggled to deal with many of the same challenges the Navy faces. The challenges they see include recruiting and retaining high-quality employees, developing relevant training, measuring training effectiveness, meeting the expectations of Generation Y, and affecting this new group's behavior, capitalizing on Information Age technology, and meeting the significant challenges associated with changing corporate culture. Appendix E summarizes the key lessons learned from each site visit. Despite the variety in company size, age, business environment, and product lines, several common themes emerged:

- Businesses and organizations are treating investments in their employees (Human Capital) as a key business strategy.
- Training is seen as a way to attract and retain the "best and brightest."
- Although organizations view training as a fundamental investment, they have difficulty correlating training to the "bottom line." Even sp, senior managers and boards "invest because they believe."
- Training is increasingly viewed as a corporate functional area
- Training emphasis is on knowledge management
- Training is tailored to the individual learner and the specific competencies required to perform the job.

Industry has recognized the tremendous benefits that technology has to offer. eLearning and web-based distance learning (DL) are being used more and more. Industry views eLearning as:

- Efficient**:** Training for all end users can start immediately at employment; courses can be centrally updated so everyone has the current version.
- Effective**:** Proven results; more effective than computer-based training (CBT); users do more, so they retain more. Makes more efficient use of student/teacher time. It is interactive and more affordable.
- Flexible**:** Courses can easily be added, and updated in real time.
- Scalable**:** Training can keep pace with growth and a changing work, home, and recreation environment
- Accessible and available**:** Courses are available online at anytime, from anywhere (this supports the concept of a "web-centric Navy")

- However, technology is not viewed as the answer to all training requirements; it is a key enabler.

Significant cost savings and efficiencies have been attributed to eLearning. The American Society for Training Development (ASTD), the OSD Advanced Distributed Learning (ADL) Co-Laboratory, and other leading consultants in the field credit technology-based instruction with reducing typical costs of instruction by 30-60%; associated improvements being either reduction in time to train (20-40%), or increases in the amount of skills and knowledge gained by learners (10-30%). Some specific success stories include:

- EDS: The average cost of training dropped to $4 per person from $60 per person per day.
- U.S. Army reduced time under instruction by 30% in 525 reengineered courses, saving 10,000 man-years or avoiding $155M in per diem savings per year.
- Days Inn achieved a 50% reduction (time & cost) in technology-based instruction over classroom training.
- Circuit City's $14M investment in e-Learning was recouped in 4 months.
- Multi-media and Training Newsletter claims a 50% reduction in time and cost to train with web-based technology over classroom training.

For the organizations that have embraced eLearning, and other web-based distance learning methods, this technology served as the impetus for cultural change. Pervasive and timely access to information and knowledge has dramatically altered informal organizational relationships, eliminated traditional vertical barriers, and vastly extended horizontal spheres of influence. Changing corporate culture to accommodate this phenomenon is undeniably hard. Successful transformations required the direct support and personal involvement of senior leaders. All organizations have experienced change and realignment problems—successful change often includes personnel changes.

## *Principal Tenets*

The ERNT findings at this point are based upon the role of training in readiness, lessons learned from internal and external sources, insights gained from Sailors, and assessment of inefficiencies of today's processes. Our discovery efforts have lead us to several fundamental tenets on which to base our recommendations:

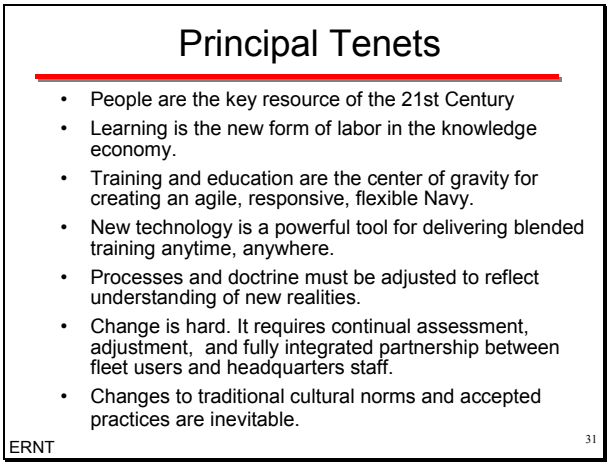


Figure 30. *Principal tenets*

In addition to the tenets noted in figure X, the bullets that follow describe many of the most important things that we have learned.

- Manning and maintaining the Fleet through this revolutionary training approach must focus on the learners' needs while measuring performance
- Application of the science of learning to Navy teaching, training and education, is at the core of the Revolution in Training
- Commanding officers, other senior khaki leaders, and especially the Chiefs Mess must be made to see the value added by the Revolution in Training
- Selecting and classifying Sailors for the right career track and satisfying their

education and learning needs, are the most effective ways to solve the requirements of learners, maintainers, and operators while answering the question: Do I get my Sailors the training they need, or keep my Sailors on-board, engaged in work that I can't get done in any other way?"

- Worldwide access to the highest quality e-Learning must be pervasive and accessible to all Sailors, all the time

- Success of Revolution in Training depends upon proper alignment of many organizations within the Navy including, but not limited to, Navy's manpower, personnel, and distribution commands

- The characteristics of a learning organization (the ERNT team set out those in figure X) are critical to the creation of appropriate cultural values for development of a self-sustaining Navy competitive advantage in the War for People

- An extremely important change will be the alignment of all training components, facilities, and functions under one commander responsible to the Fleet and to Sailors for learning and performance

- The Navy must identify, adopt, and exploit best practices, whether from the private sector or from Navy's own "Islands of Excellence"

- Training and Education technology has allowed the private sector to make extraordinary leaps in effectiveness, efficiency, and performance possible. The Navy must embrace this training technology revolution for two critical reasons:

  – It is essential for combat readiness

  – The Navy is in direct competition with the private sector for Sailors

- Sailors, commands, units and groups must be able to internalize the Revolution in Training, and see it as a tool for personal growth and improving professional performance, as well as for enhancing fleet mission readiness.

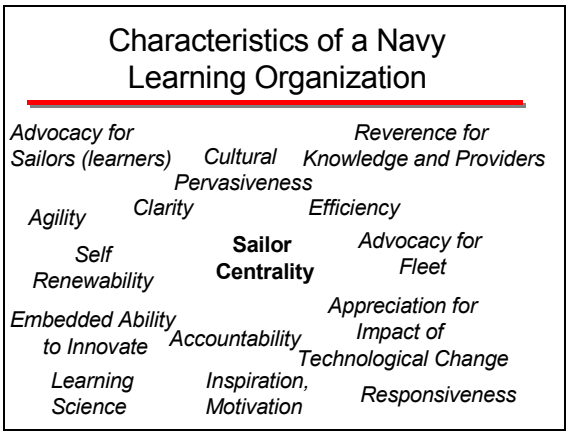


Figure 31. *Characteristics of a Navy learning organization*

# ERNT Recommendations

In this section of our report, we will present four high-level specific recommendations for improving the Navy. We will discuss the process of identifying training requirements and developing solutions, we will examine ways of aligning training organizations more effectively, we will recommend changes to the acquisition system, and finally, we will propose a lifelong learning and personal and professional development continuum for Navy Sailors.

## *Recommendation #1: Adopt a Navy Human Performance System Model*

Here are some fundamental training questions: Who writes the learning requirements? How are learning requirements validated and integrated? How are curricula plans developed? What is the product of the plan? We summarize our findings below.

- There are at least 63 commands which sponsor/generate Navy training requirements.
- Most training requirements are **not** validated by Navy CINC(s) or their equivalents.
- There are at least 48 separate command structures that can meet some Navy training requirements.
- Money is the 'coin of the realm'—that is, the command that controls the money, independent of linkage to the training commands, determines which training requirements are met and how they are met.
- Front-end analyses, which use the fundamentals of the science of learning to determine the best delivery system, are not regularly used.
- There is a complex web of independent training policy and execution organizations. In fact, there are 11 resource allocators at the Echelon I level that provide resources and policies for training and 13 major claimants at Echelon II that further support training to Sailors.
- Although there is a new coordinating council at the Echelon I (OPNAV) level, there are no coordinating councils for the 13 major claimants—each has to take extraordinary measures to share information on training systems and solutions with the others.
- Reviews of Navy training requirements, which are conducted on a notional three-year cycle, are typically rehashings of existing curricula by subject matter experts who focus on what requirements should be added. There is only ad hoc communication of these "requirement reviews" to the OPNAV sponsor—the only staff that can make significant resource or policy changes.
- Training programs that cut across resource sponsors and claimants are few (which explains, in part, why the Navy lags behind industry in investing in training technologies).
- Coordination across Navy commands that might lead to sharing training resources has just begun in San Diego and Norfolk (called the "Council of Captains"). Although it was only developed last year, early results suggest that this effort has improved the Navy's ability to meet fleet training needs.
- Feedback for training is generally limited to immediate student reactions and periodic (level 1 and occasionally 2) exams. We found no evidence of a feedback system that measures whether the training meets the requirement or improves performance (levels 3 and 4).
- We found only "training" requirements, (no human performance requirements) and many of these "training" requirements documents were so specific that there was

virtually no opportunity for training development teams to consider alternatives to traditional classroom-delivered curricula.

Based on these and other findings, we have determined that the current process for determining the basics of training (i.e., the who, what, where, when, and how) needs to change. It is clear to us that there is no 'Navy Training System' that allows for innovation or rapid response to new technologies, or ideas.

We recognize that if all performance deficiencies are written as training requirements, there is an inherent bias toward developing solutions that rely solely on classroom instruction (an effective solution for teaching rote memorization). In the end, this leads to a Navy training system that relies, almost exclusively, on formal schoolhouse training to develop human capabilities. We believe that a new "systems approach" to learning, one that links requirements, solution development and feedback, is required for the Revolution in Training to achieve it's objectives.

We have developed a Human Performance System Model (HPSM) to represent a new set of fundamental, often behind-the-scenes, processes. Figure 32 shows a simplified graphical representation of this four-quadrant process. The HPSM starts with a statement of human performance requirements (what tasks do Sailors need to able to perform?), uses the science of learning to develop optimal human performance solutions (how can we provide the required on-the-job competencies?), develops and integrates the human performance components, and then links the learning to the original requirements (did it achieve the job performance objectives?). Appendix F provides a more detailed description of this process.

## Quadrant I: Define Requirements

The first step in the process, found in quadrant one, is to define human performance requirements. Although human performance requirements can be defined by many organizations and commands, we recommend that the fleet Commanders-in-Chief (CINC(s)), the Chief of Naval Personnel, or Director of Naval approve all requirements. Operators, Sailors, trainers, performance consultants, senior commanders, and CINC(s) can better understand requirements and associated measures of effectiveness/performance if they define requirements in terms of tasks. This means breaking down jobs and job tasks into specific behaviors and competencies. Once these are defined, the CINC (or equivalent) must validate and prioritize them to determine specific job performance standards (we will talk more about the role of the CINC(s) later in this section). In addition, a dynamic component is essential—job performance requirements are appropriate for different stages of a career (apprentice, journeyman, or master levels of proficiency).

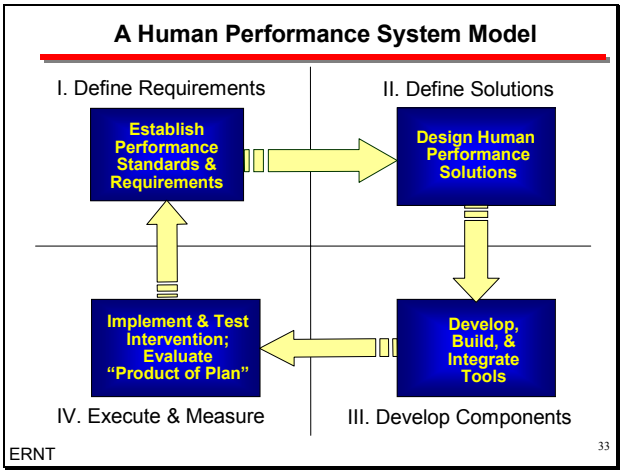


Figure 32. *A human performance system model*

## Quadrant II: Design Solutions

Once dynamic human performance requirements have been established, certified, and prioritized, they need to be translated into a menu of options for intervention from which the CINC(s) can select. The crux of this process is analytical—that is, analysts and subject matter experts must evaluate the requirements and determine how best to meet them. This is the step in the process where the science of learning and human performance is applied.

Note that the requirement may not always be to achieve 100 percent war fighting capacity. In the real world of constrained resources and conflicting interests, the CINC(s) may establish

performance criteria to achieve less than optimum performance (i.e., C2 or C3) in certain areas in order to emphasize other, higher priority areas.

Figure 33 displays the process associated with Quadrant II in more detail. As noted, this process depends on the skill, talent, and awareness of experts who can analyze human performance requirements and develop "enhancement solutions." The first step in this quadrant is to translate human performance requirements into competencies—that is, what does the learner need to have in order to accomplish the job or task? Competencies can be expressed in terms of knowledge, skills, abilities and tools (KSAT(s)). Other models factor in attitudes as well. Once competencies are established, the range of possible ways those competencies can be imparted must be considered. Following this "requirements first–solutions second" approach allows all of the options for improving performance to be considered instead of considering only training solutions. Decision-makers can evaluate the importance of other enhancement solution options such as:

- Manpower adjustments
- Structured on-the-job experience
- Improvements in technical support
- Job performance aids (eg., wearable hardware)
- System redesign
- Changes in operating or maintenance procedures.

An essential part of the HPSM is the contribution of the performance consultants. There is a substantial movement in industry toward using performance consultants to assess and help solve human performance problems. Performance consulting is a disciplined approach to diagnosing individual and organizational performance issues and developing the entire range of possible solutions.

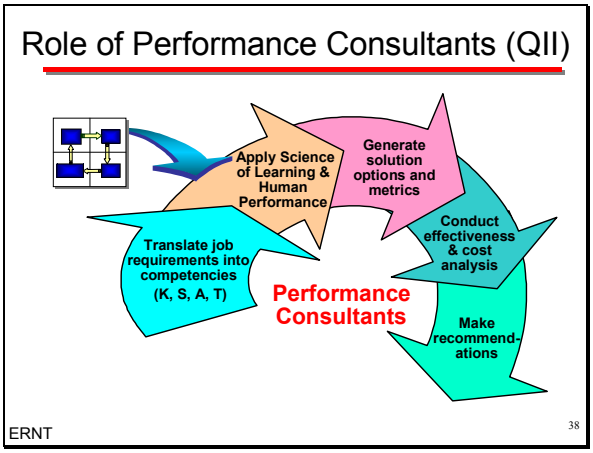

Figure 33. *Role of performance consultants*

Performance consultants understand human performance and competencies and also appreciate the range of potential solutions for imparting those competencies. Ideally, they have an educational background and experience in an applied human performance/behavioral science field. Some have referred to performance consultants as "education specialists on steroids." They require all the competencies of education specialists, plus an understanding of the job context and the contributions of structured experience, wearable hardware, and other performance enhancement options. Fundamentally, they act as system engineers for the human part of people and machines working together.

In addition, performance consultants always work in close association with subject matter experts and end users when they are most effective. In fact, it is almost always the case that a team of performance consultants with a variety of complementary expertise will be deployed to analyze a performance situation. It is also important to note that many companies have recently employed performance consultants to deal with urgent issues–in stark contrast to the historic use of education specialists as long-term curriculum design experts.

## Quadrant III: Develop, Build, and Integrate Tools

The recommendations (solution options) generated in Quadrant II are passed to the decision-makers in Quadrant I the CINC , or

equivalent, selects the appropriate intervention(s) based on effectiveness, cost, etc. The choice(s), then, are passed to Quadrant III for development. A number of processes and organizations may contribute to the building of the integrated components of the solutions. As we noted earlier, solution options can include traditional classroom instruction; e-Learning; job performance aids; electronic performance support systems; manpower adjustments; on-the-job-training; integrated electronic technical manuals (IETM(s)); simulations, models or games; experience; job redesign/automation and so on. Performance consultants stay engaged to conduct initial assessments and provide important feedback to developers as the intervention is being designed. Development of the specific training tools in Quadrant III should take lace in the competitive marketplace.

## Quadrant IV: Execute and Measure Effectiveness

Quadrant IV is where both the execution and the evaluation of the intervention occur. If training is the solution chosen and built, it is here in Quadrant IV that the training is done and the results measured. Executing the intervention, which is separate from "how to meet the requirement" (determined in Quadrant II), applies the solution built in Quadrant III. Although many organizations can be involved in the execution, their efforts can be integrated and coordinated so that duplication is avoided. AN integrated training (or intervention) organization can leverage the strengths of and improve the efficiency of, multiple training entities.

The evaluation function of Quadrant IV begins with the training experience. The evaluation provides for immediate level 1 and 2 feedback at this point:

- Is the student enjoying the experience?
- Is the student learning facts?

In addition, level 3 and 4 feedback is conducted by the CINC(s) and used for evaluating the effectiveness of the intervention on the level of performance that is important to them. In other words, the organization that sets the requirement gets to evaluate the product of the plan. This feedback includes:

- Is the Sailor more productive in prescribed tasks?
- Is the team/command more proficient because of the performance enhancement solution?

At the conclusion of the Quadrant IV evaluation phase, the CINC(s) and other CINC-equivalents, as well as performance consultants and executors, receive information on whether the original objectives were met. This information is then used in Quadrant I for refining performance requirements and in Quadrant II for evaluating the intervention strategies. By allowing the end-users to determine human performance requirements and incorporating them into both the first and last steps of the process, we have a mechanism for continuous improvement based on direct feedback, changing operational needs, and advances in technology.

There are compelling reasons to make this change. In the HPSM, job requirements initiate the process. This has several advantages. First, operators know what tasks are required in order to form high performing teams. Second, performance consultants can translate required tasks into human performance systems that are most likely to achieve the competencies required to successfully complete the tasks. Third, instructors in the system can make modifications as they become apparent because they can easily determine which ones will lead to more successful completion of the course. Fourth, because the requirements are defined as tasks, they are easier to understand, test and modify. Lastly, the sponsors of the requirements can easily measure whether “graduates” have successfully completed their studies. If graduates can perform the defined tasks, the system has worked. In essence, by defining the requirements in terms of tasks, the requirement sponsors, the performance consultants, the instructors and the Sailors can communicate in the “language of work.”

Requirements are also placed within the purview of operational commanders, the Navy CINC(s), and the Director of Naval Reactors, and the Chief of Naval Personnel. Between these staffs, job performance requirements should be validated so that redundant and out-dated requirements can be deleted—requirements can also be prioritized by those closest to the operations.

The science of learning has matured to the point where some general "rules" have been developed and tested by performance consultants. Applying these rules, and eventually contributing to the rule set, will allow us to offer the best menu of blended learning solutions so long as we explicitly determine how we are going to meet job performance requirements.

This model suggests that Navy's use of "training requirements" has lead to traditional and unimaginative solutions. We worked through 10 job performance "use cases" using the HPSM and found that adopting the HPSM leads directly to retiring the term "training requirement." (We present these "use cases" in appendix X. Training, as one of many performance-enhancing tools, is merely a method of meeting an operational requirement, not a requirement itself. As part of this Revolution, we recognize that there are only "human performance requirements" and that by stating them in terms of the tasks required to do a job, we open the door to new learning technologies, new learning continuums, and a more responsive human development system.

For a more detail description of the HPSM, see appendix F.

## The Navy Learning Model

One way to fully integrate training technology, human performance requirements, and the Science of Learning into the Human Performance Systems Model is to coalesce these three elements into a framework. This framework guides the formation of solution options for performance issues. In the earlier section, important information gained through the study of the Science of Learning revealed the following:

- Individuals respond differently to various learning techniques.
- Learning can be improved when the instruction can be tailored to the individual's unique needs.
- Individuals acquire knowledge more thoroughly when more than one training delivery method is used.
- The transfer of learning is more comprehensive when practice, support, and feedback reinforce newly learned skills

When we consider the various ways that people learn and retain knowledge, the Science of Learning assists us in developing a framework for an effective and efficient learning system. By developing a model, we can link the theoretical concepts to practical application within Navy training. This can be further linked into the Four-Quadrant Model ( in QUadrants II and III) to provide the most appropriate method of instruction for the desired goal.

Throughout our research, we learned that many commercial enterprises have found it useful to characterize learning options in this form. The model below describes several ways in which people learn, arranged into a framework that can be used to design training delivery methods. By arranging the learning techniques in this model, corporate leaders and learners alike can understand the full range of opportunities for teaching and learning afforded by melding the best of traditional approaches with the newest technologies. We can also incorporate these approaches into our special training environment by utilizing this model when designing training solutions at the unit or group level. This model guides the development of a war fighter's natural preference for simulated or live-environment training, and provides alternatives when those options would not be best suited to attain the desired objective.

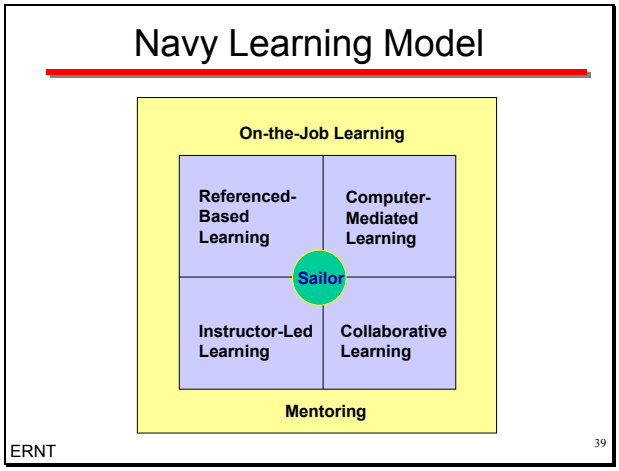

Figure 34. *Navy learning model*

The four blocks in the center of this Navy learning model (figure 34) represent the four major methods of learning. The surrounding learning level, *On-the-Job Learning* and *Mentoring,* reflect the enormous importance to the Navy especially of hands-on, trial and error, mentor-guided learning in the performance of complex tasks by Sailors. Understanding this model of learning helps us explain how training solutions should be developed and built to integrate the Science of Learning and the concepts of human performance. Here is more detail on the five components of our Navy learning model:

*Reference-Based Learning*. Describes situations where the learner gains access to information and knowledge as needed. It is characterized by a one-way interaction between the learner and the knowledge. In its most common form, it is reading, that may or may not be mediated by technology. Understanding knowledge management (i.e., when and where knowledge is required) and database design are central issues in order to realize the potential of referenced-based learning. In addition, developing the appropriate human-computer interface is essential when technology is involved. Examples of referenced-based learning might include equipment/design manuals, CD-ROMs, tactical publications, Internet databases, reference matter, videos, and books.

*Computer-mediated Learning*. In this category, the learner *interacts* with a computer, system, or other technology in order to learn. The system reacts to the learner by providing hints or cues, branching to new material, tailoring instruction, and/or providing feedback. Intelligent training technologies (e.g., automated performance assessment, diagnosis and feedback) are crucial to this type of training and will eventually, as technology develops, allow for individual tutoring. Examples of computer-mediated learning include: computer-based training, intelligent tutoring, simulations, games, scenario-based training (one learner), training devices/simulators/stimulators and interactive electronic technical manuals (IETMs).

*Collaborative Learning*. Learning in this category occurs when learners teach and guide one another. Often, but not always, learners' interactions are computer-mediated because learners are physically dispersed. This type of training may or may not include a formal instructor or expert and often involves a scenario or exercise. Technologies necessary to provide and enable collaborative learning environments include those that allow distributed users to be networked together. Communication bandwidth is an important ingredient. Examples of this type of training include: chat rooms, multi-player games/simulations, peer-to-peer mentoring, computer-mediated mentoring, distributed team training, scenario-based training (multiple players), multi-platform exercises/team training and web-based study groups.

*Instructor-led Learning*. In this category, the learner interacts face-to-face with an instructor and other learners. This type of learning describes traditional, classroom-based learning as well as other techniques such as laboratories and role-playing. Electronic classroom technologies can improve this type of instruction, and instructors can lead dispersed students in "netted" classrooms. Other examples include traditional classrooms, electronic classrooms, laboratories, role-playing, and study groups.

*On-the-job Learning and Mentoring*. Learners in this category interact with their own equipment and/or situation as a mechanism for learning. This type of learning provides the basis for

continuous learning environments, and requires an appropriate climate for learning. OJT can be individual or group-based. This category also includes specific mentoring by leaders on the job. Successful learning in this category benefits greatly from embedded training technologies, including automated instructor aids and automated assessment and feedback. It is also dependent on the ability of leaders to mentor their subordinates and of peers to mentor one another. Examples of this category include: embedded simulations/stimulations, mentoring and coaching, continuous learning, guided team self-correction, electronic performance support systems, and decision support systems. In interviews, Sailors told us that OJT was among the most valuable, relevant, and effective training from which they benefit.

In terms of developing training solutions to human performance requirements, the Navy Learning Model provides a framework for integrating learning concepts, appropriate methods of delivery, and achieving desired training goals. Understanding this model of learning will help us explain how the set of human performance improvement solutions developed in Quadrant II, and approved in Quadrant I, should be built in Quadrant III and fielded and applied in Quadrant IV. This further enables key organizations to build on past training successes and develop a more robust repertoire of training options.

## CINC Roles and Responsibilities

Among the most significant implications of the four-quadrant Human Performance model is the increased role and responsibilities of the fleet CINC(s), OPNAV (on behalf of the Chief of Naval Operations), the Director, Naval Reactors, and certain other officials. We look first at the expanded role of the fleet commanders-in-chief, then address the possible changes in duties for others. Although the CINC(s) are implicitly involved in many of the same processes today, in today's environment risk is subordinated to the assumption that every unit can accomplish all of its assigned missions. The four-quadrant process, with its specific job/task requirements and objective measures of effectiveness and performance, allows the decision-makers to make choices with a much greater understanding of the consequences.

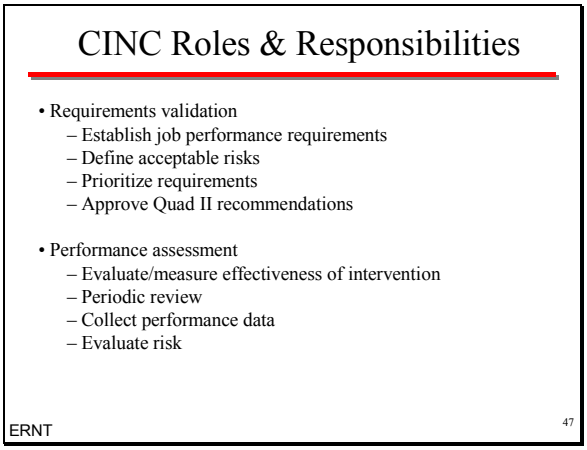

Figure 35. *CINC roles and responsibilities*

In Quadrant I, the CINC must validate all individual, unit, and group job/task requirements (see figure 35). This requires a direct job-task-skill competency linkage. Today, the Navy has broad Battle Group level tasks which are generally linked to Joint Mission Essential Task Lists (JMETL), and is gradually developing the associated Navy Mission Essential Task Lists (NMETL). This linkage is essentially severed before reaching the individual Sailor level, where rating requirements are based on knowledge-based occupational standards (OCCSTANDARDS) rather than job-skill based tasks.

To assist in this process, we assume that the CINC will delegate many of these job task analysis and measurement responsibilities as follows:

- Manpower: Navy Manpower Analysis Center (NAVMAC)
- Battle Group: C2F and C3F
- Unit: Type Commanders (TYCOMs).

The CINC must also select from among the options presented by a Human Performance Systems Organization (HPSO) for improving human performance those that are most suitable for meeting learning requirements and other

criteria (cost, timeliness, etc.). It is important to note that the CINC may choose only a portion of the recommendation, even though an optimum, blended solution is preferred. The less than optimum solution will, in all likelihood, be designed to produce a lower level of skill proficiency, which will then become the target objective for fleet performance measurement. In any case, whatever option is chosen must be funded and implemented to ensure end-to-end accountability.

This particular function requires that the CINC be cognizant of all aspects of human performance development and management. It is envisioned that HPSO representatives would be assigned to the CINC staffs to assist in this endeavor. This may well demand additional people, skills, and other resources for the fleet CINC staffs. The staffs will need to be augmented in a variety of ways.

The CINC must determine the minimum acceptable readiness, at the individual unit and mission level, given available resources. The CINC then evaluates the "product of the plan" (in Quadrant IV) to ensure that the organizations responsible for delivering the product have been effective and efficient. From the organizational alignment perspective, this provides the opportunity to provide direct feedback to the original solution provider.

A few other Navy officials should have similar responsibilities. For general skills in the development of both Enlisted and Officer Sailors, DCNO (N1), on behalf of the CNO, should develop and approve requirements for training. N1 should relate to the HPSO, in this case, in the same way as do the Fleet CINC(s). Certain other community sponsors, as well as the Director of Naval Reactors (for nuclear power training) should function in the same way.

## A Human Performance System Organization (HPSO)

Explicitly managing human performance is not a function the Navy performs today. Significant change and growth will be required to implement this concept, which is one of the fundamental tenets in the proposed 4-Quadrant Human Performance System. Performance descriptions for Navy performance consultants, the single most important ingredient in the HPSO concept, must be developed, and the competency grown from the Navy's inventory of Educational Specialists and others. In the short-term, experts from the private sector may be needed.

A HPSO would design both near and long-term human performance solutions. These solutions would consider hardware, personnel, training and operational factors. The HPSO's optimum solution for any particular requirement would be developed without resource or time constraints, but palatable alternatives would also be developed and prioritized against available resources, time constraints and warfighting mission value.

A HPSO would perform most of the functions in quadrants II and III. These include:

- Apply Science of Learning and Human Performance considerations to Navy job requirements
- Analyze and diagnose performance problems
- Develop performance measures
- Provide learning objectives
- Generate knowledge, skill, abilities & tools (KSATs)
- Develop and recommend blended human performance solutions
- Transition Research and Development innovations
- Maintain a 24/7 Help Desk for human performance problems
- Maintain internal workforce Navy currency in Science of Learning

- Assess the cost effectiveness (e.g., return on investment) of performance and learning solutions

- Develop and maintain Navy-wide strategic learning plans (simulators, e-Learning, virtual reality, etc.).

Several different organizational constructs, ranging from fully centralized to fully decentralized, are feasible in implementing a HPSO solution. Regardless of the structure, the organization should represent the equities of all warfare and support communities in the Navy, as skill-based intervention solutions are rarely platform specific. The ERNT felt that the ideal structure would be a "hub and spoke" organization, with about a third of its members at the hub and the remainder in the field (see figure 36).

The hub (or core component) would provide the centralized control and continuity, maintaining connectivity with industry and academia, developing and managing "master plans." It would identify common human performance deficiencies and interventions, and research and assess best practices from industry. It would also be the "brain trust" of human performance experts, available to support all organizations in the Navy. It would keep abreast of advances in R&D to ensure that the Navy incorporates the latest methods and technologies into its solutions.

The spoke component (i.e., field detachments) would function as the "browsers." They would be located with the customer, fully immersed in the current Fleet environment, fully accessible and well known to war fighters in the Fleet concentration areas. They would be assigned on the Fleet CINC and Type Commander staffs, at schoolhouses and training commands, and wherever else they are needed. In short, they will be positioned to respond rapidly to human performance problems at the individual, team, unit and group levels. We feel that human performance experts should rotate between the field and the HPSO core to sustain a high level of Fleet experience.

The ownership of the organization will have much influence on the solution set. To whom should this HPSO report? The ERNT considered several options:

- To the Fleet CINC(s). As previously discussed, the CINC(s) we see as responsible for establishing the war fighting requirements, determining the acceptable level of risk, assessing the success of the training interventions in the IDTC, and for approving the different HPSO solutions. The ERNT felt the Fleet CINC(s), in a resource constrained environment, might be driven to support the immediate, operational requirements to the detriment of the more long-term pipeline training process. Not an optimal alignment.

- To OPNAV N7. N7 has the responsibility for resourcing warfighting requirements, which has traditionally been focused on platforms and systems. N7, under the N79 construct, also currently oversees the training solution.

- To OPNAV N9. An ERNT recommendation to improve the OPNAV training functionality. N9 would be an advocate for economical and efficient training solutions, while providing organizational tension in the acquisition process.

- To OPNAV N1. CNP owns the manpower portion of the human performance solution.

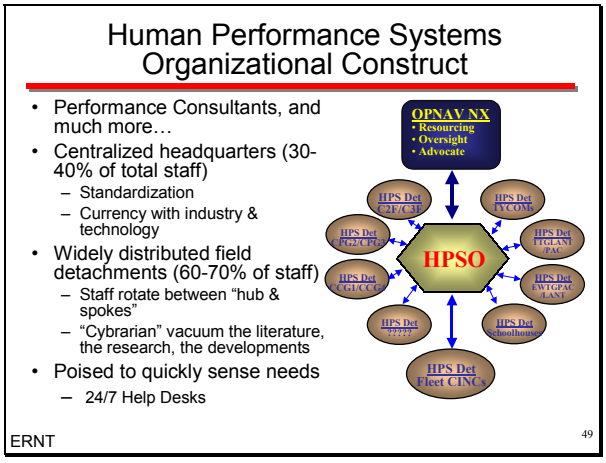

Figure 36. *Proposed construct for the Human Performance System Organization*

In the near term, a virtual HPSO core could be established at Naval Air Warfare Center – Training System Division (NAWC-TSD). As with all Navy laboratories, NAWC-TSD is heavily immersed in training technology and tools development. However, NAWC-TSD currently also supports all warfare communities, and is active in the Joint arena. It is geographically immersed in a corridor of emerging Modeling and Simulation technology in Orlando.

This virtual HPSO should challenge current high priority human performance issues (selected by the Implementation Team) for analysis. Performance consultant teams could be deployed to make assessments of the human performance requirements and to translate these into required competencies. Once competencies are established, the performance consultant teams could consider various solutions and recommend a solution package that most effectively and efficiently imparts the competencies.

Prototyping this process in a virtual manner (linking team members on the web) will provide valuable lessons on different organizational constructs. We talk more later about incremental implementation of Training Revolution concepts.

# *Recommendation #2: Align Training*

## Alignment

As discussed earlier, an organization's effectiveness and efficiency is heavily dependent upon its alignment. An optimally aligned organization functions as a whole, adjusting and evolving in response to its established goals and external environment in a adaptive fashion. Unfortunately, it is extremely difficult to achieve, or sustain, optimum alignment in a constantly changing world. As the external environment changes, the organization must evolve; common pitfalls include:

- As an organization downsizes, it continues to use the same structure and processes. This results in a "death spiral" in which the organization continues to commit additional resources to inherently inefficient processes.

- Leaders reject new data that does not agree with the existing, strongly entrenched organizational beliefs and culture.

- New technology becomes available, but the organization does not adjust to the new opportunities.

- Different components of the organization are responsible for different parts of an overall process, but the metrics and performance standards used by the various components differ, resulting in the organization essentially fighting itself.

Some of the inefficiencies discussed earlier in this report may be solved by alignment of the Navy's training organization.

## Establish an Integrated Training Organization

The Navy suffers from a lack of a single entity responsible for training. Although training problems are cumbersome at the OPNAV level, redundancies and duplications are magnified at the Fleet level. Currently, the Fleet CINC(s), CNET, and the SYSCOMs all own and operate

commands that conduct training in major Fleet concentration areas. For the most part, these commands act as independent agencies, each using its resources to conduct training in support of its own mission. Although these training facilities are seldom fully utilized, the Navy rarely looks across the different commands to accomplish training missions. For example, it is possible to have qualified instructors at a CNET command, the equipment required to teach at a SYSCOM activity, and the waterfront space to teach at a Fleet activity; meshing the resources would often improve training and performance but the current system works best in stovepipes. Today, this type of dilemma is solved only when exceptional individual initiative makes it work. There is nothing in the system to make this standard practice. More importantly, if the Navy focused on the job skill requirement, it would discover amazing similarities in fundamental basic training requirements. This would drive the Navy to eliminate the secular institutions and develop facilities that thrive on common objectives. Navy-owned industrial centers in major FCAs would lower the cost of training, improve the quality, and help responsiveness to fleet needs.

The ERNT team looked for a way to alleviate the adverse impact of the fragmented training structure multiple training organizations, reporting to diverse administrative and functional chains of command. We discussed several different options, each of which has strengths and weaknesses. We also considered options to improve organizational alignment at two levels of detail:

- Scope of responsibility
  - All enlisted pipeline and fleet schoolhouse training (IST, Specialized Training, F/T schools)
  - All officer and enlisted pipeline and fleet training (FRS, NSAWC, ATRC, etc)
  - All IDTC training
  - All education commands (USNA, NWC, NPS, etc)
  - Sailorization Commands (RTC, SSC)
- Reporting authority
  - To CNO
  - To Fleet CINC(s)
  - To TYCOMs

Our lessons from history, our Sailor interviews and our own 4-Quadrant analyses indicated that training delivery for individual and unit-level training must be controlled, coordinated, and prioritized by a single entity. This entity should:

- Evaluate and measure the effectiveness of training interventions (this evaluation process must be driven by Fleet input)
- Conduct periodic reviews
- Collect performance/results data
- Diagnose intervention problems
- Provide feedback to quadrants I, II, and III
- Recommend improvements
- Assess cost-effectiveness/return on investment
- Control/coordinate all training activities and the processes
- Be responsible for the completion of the Inter-deployment Cycle (IDTC) requirements, as stipulated by Fleet CINC(s), C2F, C3F and the TYCOMs
- Manage all schoolhouse training, including C, G, F, & T courses.
- Identify current redundancies, commonalities and efficiencies
- Review Officer Education & Training Management (XX37) subspecialty

- Identify and expand the concepts inherent in the current "Islands of Excellence"

Given these responsibilities, issues and factors, we felt such an organization would require its own funding authority and be of sufficient seniority to play equitably with C2F, C3F, and the TYCOMS.

We recommend that an echelon II Integrated Training Organization be established. This organization would report to the VCNO (whom we propose be designated the Navy's Chief Learning Officer), and have the authority to allocate training activity resources, to include instructors, equipment, and facilities to best meet Fleet training needs.

## OPNAV Alignment

During our initial research phase, we found that that Navy has conducted nine major studies of its training organizations and functions since 1971 and has reorganized its training establishment five times over the same period. The Navy Research Advisory Council (NRAC) conducted the most recent study in 1999. These nine studies found that clear lines of accountability and responsibility for training were not established at OPNAV, and consistently advocated a strong focal point on the OPNAV staff. We found that while some changes have been made, and arguably some improvements have been put in place, the following conditions still exist today:

- There is no central organization responsible for Navy training policy, planning, resource management, and general oversight
- There is no central accountability for the establishment of training requirements or policies
- There is no common structure to effectively measure and evaluate training program performance.
- There is not an effective central system for tracking and controlling requirements and resources
- The OPNAV staff is not adequately equipped, either in seniority or overall size to monitor and influence training functions/decisions during the PPBS process
- Multiple OPNAV organizations have training responsibilities and can independently develop training policies, establish requirements, and fund solutions
- Principle authorities are wearing "dual hats" which weaken central authority and diffuse training leadership

Consequently, training remains dispersed and fragmented at the OPNAV level and each OPNAV division establishes its own training policies and practices. This diffuse power and span of control at OPNAV leads to fragmented and inconsistent execution at the lower echelons. This is consistent with our general findings that there are only "islands of excellence" in Navy training organizations today. One of the goals of the revolution is to tie together these islands into "continents of excellence." Organizational alignment, from OPNAV to the small training unit, is required for Navy to share the best practices across training organizations.

Organizing OPNAV properly is even more critical if one goal is to refocus the Navy training culture on the performance of Sailors and teams, instead of on the development of platforms and equipment. Strong leadership, adequate staffing and clear lines of responsibility and authority are essential ingredients that have been missing in the past. The lessons from previous reorganizations suggest that strong, centralized control and decentralized execution will prove to be the best combination for this situation. An OPNAV training structure focused on revolutionizing the Navy approach to training should have the following essential characteristics:

- Full time flag (or SES equivalent) leadership
- Direct access to CNO

- Responsibility for developing Navy-wide training policies
- Responsibility for establishing Navy training requirements processes
- Responsibility for developing an annual integrated sponsor program proposal
- Responsibility for establishing and monitoring a training performance tracking system
- Staff size aligned with mission.

The ERNT team discussed several different options to improve organizational alignment. We believe that it is far more likely that we will achieve the goals of the Revolution with a single OPNAV training and education staff. Support for the new requirements and requirements integration processes requires a single resource staff that reports directly to the CNO. Establishing new Navy-wide training and education policies, which is required to change Navy-wide behavior, also requires a single voice that carries OPNAV level of authority. All of our options focus on an integrated OPNAV training division. Alternatives include:

- A 2-star flag officer (or equivalent) leader reporting to N7 (status quo -- N79)
- A 3-star flag officer (or equivalent) reporting directly to CNO (N9)
- A 2-star flag officer Assistant DCNO (or equivalent) reporting to N1/CNP (N1C)
- A 2-star flag officer (or equivalent) reporting to VCNO (N09T)

Among the alternatives mentioned above, we recognize that various OPNAV organizational arrangements, including the current one, could be made to work to some degree. Recently, the Navy established an OPNAV coordination council chaired by N79 in an attempt to provide Navy-wide consistency. However, this council is still only a committee comprised of OPNAV staff members that report "additional duty" to N79. Even with the OPNAV coordinating council in place, training responsibilities continue to be widely distributed across the OPNAV staff. Suggestions that have been considered to address this include:

- The VCNO's role as the CNO's Chief Learning Officer.
- Formal establishment of the OPNAV Training and Education Council (OTEC)

Although an OTEC would provide a focal point at the OPNAV level for matters of Navy education and training, it would require the VCNO to add a policy level, decision-making body to the existing layers. This moves us away from the more effective approach of centralized control and decentralized execution. In addition, lessons learned from arrangements attempted during the past thirty years suggest that a highly effective OPNAV component is critical to success – there are simply some things that have to be done by OPNAV. Coordinating across 11 divisions with training resources and policy control is very difficult for training executors.

We recommend that the CNO realign the training and education support funds that are programmed and budgeted by these resource sponsors to a newly established Director of Navy Training and Education (N9) organization. The new N9 will serve as the principal training adviser to the CNO/VCNO as the OPNAV focal point on matters of Navy education and training.

Figure 37 shows what the recommended OPNAV organization might look like. N9 would work for the VCNO, (the Navy's Chief Learning Officer). N9's mission would be to establish integrated training requirements processes, build strategic plans, develop training and education policy, advise principles on training issues, approve training plans (both Navy Training System Plans for acquisition programs and schoolhouse input plans), and program funds for the operation of the HPSO and the Integrated Training Organization (ITO).

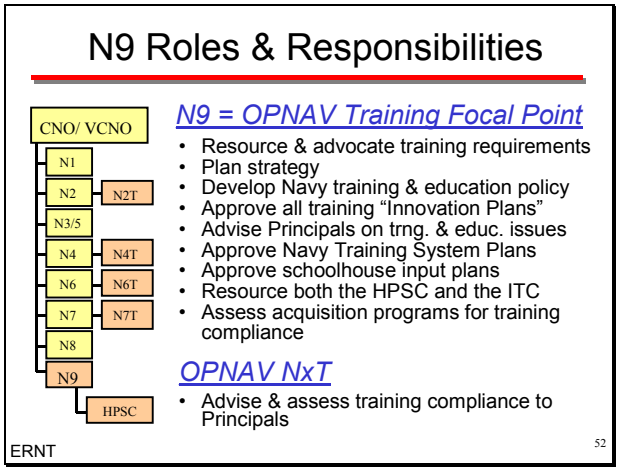

Figure 37. *N9 roles and responsibilities*

Our recommendation is for the current training staffs within N095, N2, N4, N6, and N7 to be consolidated within N9, with small cells remaining with Warfare Sponsor staffs to represent the training functions that support the acquisition programs (i.e. development of the requirements for training devices, technical training equipment, development of training materials to include factory training, and the initial development of the Navy Training System Plans). We also recommend that the individual training staffs within N7 be combined into one training organization reporting to N7. Those personnel not directly involved in the management of training within the acquisition programs will be transferred to N9.

## Establish a Transformation Command

Balancing recruit quality mix, rating and community health, and fleet needs with all-Navy end-strength requirements is a complex task made more difficult by competing interests of partner organizations, and limited resources. Navy end-strength requirements and the challenges of the recruiting marketplace can force recruiting decisions to be made without regard for Fleet quality and quantity needs. Recruiting production also can violate the boundaries of training and education capacities. Some rating communities (and schoolhouses) have been recruited at 150% or more of Navy requirements, while others remained grossly undermanned. Alignment of the recruiting and recruit training center efforts, under the auspices of a Transformation Command, would help unify the process and the goals of the organizations, allowing smoother personnel policy and strategy decisions. The ERNT considered several reporting options for a Transformation Command:

- To the VCNO, which would force this very important function to have a more prominent status.
- To an Integrated Training Organization, which would be responsible for all other Navy training. This would align all organizations in accordance with the "Street to Fleet" concept.
- To the Chief of Naval Personnel (CNP)

The ERNT recommends the Navy establish a Transformation Command, with responsibility for both recruiting and recruit training functions, reporting directly to the Chief of Naval Personnel (CNP).

This alignment would result in the single organization responsible for transforming Civilians into Sailors. This command would have the primary goal of providing the required number of accessions, in the correct mix, ready for Fleet training, and motivated to learn. It would allow the trade-offs between the quality and quantity of accessions to be made by one command having the long-term interests of the Fleet at its core.

The Transformation Command will bring the full resources of recruiters and recruit company commands, under the control of a single command, in a focused effort to identify, recruit, cultivate, and develop the high-quality young men and women needed for the 21st century Navy. Under the Transformation Command, necessary manpower, personnel, and training processes and systems can be linked, positive direction set, and accountability for the product maintained; it brings the focused energies of the Navy's recruiting and training competencies to bear on one of the most important processes for sustaining the quality, and producing the talent

of the Enlisted force on which the Navy depends.

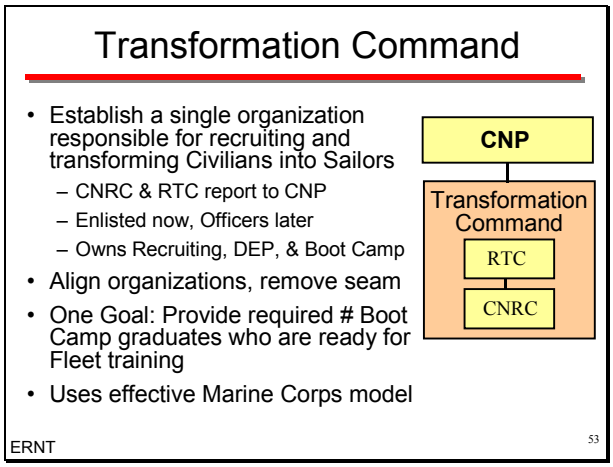

Figure 38. *Transformation command*

The Transformation Command would serve both the fleet and new recruits. It would place the Sailor at the center of its philosophical focus—serving Sailor needs and expectations, committing to Sailor personal and professional development—while producing the right mix of sailors prepared for training in the areas of their interests and talents for service in the Fleet.

## *Recommendation #3: Emphasize Human Performance in Acquisition*

One of the most important changes that must occur in Navy training is the way in which Program Managers consider training and human performance issues in the design and acquisition of systems. When the Navy acquires systems that fail to take operators and maintainers into account, the training function must cope with teaching people to use difficult, non-intuitive systems. The Navy needs mechanisms to hold Program Managers accountable for sound human-centered design and to ensure they consider training early in the system design.

The Navy must provide Program Managers with the knowledge and tools they need to evaluate human-performance and training-related proposals from industry. It must develop incentives that reward Program Managers for actively considering training. For example, training and other human performance issues must be Key Performance Parameters (KPPs) in acquisition. These KPP metrics should include threshold and objective values that address: compliance with human engineering standards, human error rates, workload, communication accuracy, productivity (amount completed per unit time), time to perform or respond, and total ownership costs. Because they make decisions with training implications in program management, resource sponsors and programmers/budgeters must also do their part.

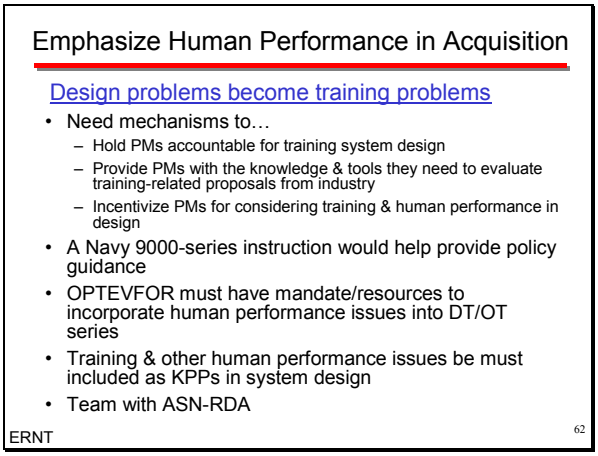

Figure 39. *Proposed changes to acquisition that emphasize human performance*

Several other measures in the acquisition process are also required. First, because acquisition reform shifts much of the responsibility for system design to industry, we need a mechanism to test the human performance and training-related aspects of the system. Currently, the Operational Test and Evaluation Force (OPTEVFOR) does not have the expertise or the mandate to assess human performance issues in systems. We recommend that this change. Specifically, we believe that OPTEVFOR should have the resources and knowledge to incorporate human performance and training issues in the DT/OT series.

Another required step is the creation of a new Navy-wide instruction to guide the development of training systems. Such an instruction should provide policy and institutionalize best practices in training system design. Finally, the training community must team with ASN(RDA) to develop acquisition-related policy that ensures optimal training and human performance design.

## Human Systems Integration

The overarching process of Human Systems Integration (HSI) includes methods to design platforms and systems for the Warfighter. As defined in DOD 5000.2R, HSI comprises the elements of systems engineering and logistics support that address requirements and resources for the human in the system. Specific elements include manpower, personnel, training, human factors engineering, system safety, occupational

health, personnel survivability, and habitability. The primary objective of HSI is to influence design early; so if problems are found with any of those elements, they can be addressed when it is most cost-effective to do so.

The DD 21 program has embraced HSI and the corollary concept of Optimal Manning. Optimal Manning uses the principles of HSI and related cost/benefit trades from a total ownership cost standpoint to determine the right number of crew members. Several elements in the DD 21 program facilitated Optimal Manning, including specific HSI guidance written into the Mission Needs Statement (MNS) and the Operational Requirements Document (ORD). In the ORD, a manpower KPP was included with an objective of 95 and a threshold of 150. By making manpower a KPP, the spotlight was put on HSI early in design, and that focus has totally changed the way Industry teams are designing the ship. Most notably, by having that focus early, the manpower, personnel, and training sub-systems for DD 21 are, in fact, being designed as part of the ships systems.

HSI changes the way the system design process is accomplished. It also changes the way training requirements are satisfied. For training to be effective in an optimally manned system, the Navy must embrace an integrated and interoperable design approach. In addition, a well-designed system, with the Warfighter considered as a component of the system, changes the way systems are operated and maintained. Appropriate cultural, tradition, and policy issues also must be addressed. For DD 21 the Program Office has established a Policy Clearing House to work these issues.

Much remains to be done to ensure that human requirements and capabilities are fully understood and integrated into the system as HSI is applied to Navy systems acquisition. To provide the necessary processes, products, tools and data required to support HSI and Optimal Manning the Navy must expand its research and development (R&D) program in these areas. R&D is needed to develop human performance models to support the derivation of human requirements early in system development, and to expand the development of tools to design for the Warfighter, especially where these elements support workload reduction and the interaction of humans with automation. R&D is particularly needed in developing tools, methods, and data associated with integrating humans into networked systems, developing interfaces for total systems and force-level information management, and providing techniques for knowledge generation and dissemination. R&D is needed to develop advanced techniques for applying simulation to Navy systems, including engineering, test and evaluation, operational, and training simulation. Additional training R&D is needed to develop training technology applications, such as embedded, integrated, or organic trainers, simulators, stimulators, intelligent tutoring, virtual environments for high fidelity training, automated authoring of instructional materials, and team training techniques.

# *Recommendation #4: Establish a Lifelong Learning Continuum*

The Navy must establish a continuum of lifelong learning and personal and professional development. This is a Total Force continuum, a philosophy that can be applied equally well to Officers and Enlisted, reserve and active. It must improve Sailor performance; recognizing that human capital is a highly perishable and underutilized resource. This continuum must address and eliminate the inefficiencies and dissatisifiers that we identified earlier in this report. It must capitalize on the 5-tier Navy Learning Model, the 4-Quadrant Human Performance Model, the alignment of training organizations, and the acquisition recommendations (designing systems for people) outlined earlier in this report. How then do all these organizational, processes and tools fit together?

## Overarching Principles

Our discovery efforts have convinced us that four major principles must define the Navy's commitment to lifelong learning, and personal and professional development. We characterize these as the pillars of the continuum depicted in figure x. These fundamental principles are *Covenant Leadership*, a *Demonstrated Commitment to Learning*, a *Navy Learning Strategy*, and an *Empowered Individual Learner*. Together, these values should shift the Navy's culture more toward Sailor-centricity. We feel the resultant organization will embrace learner advocacy, be self-renewing, promote reverence for knowledge, and knowledge providers, use the science of learning, and be inspirational to the individual Sailor.

We place these principles within the context of a typical Sailor's career (for ease of presentation we will focus on the enlisted continuum in this report). We feel the Sailorization process should begin the moment a recruit signs an enlistment contract and commits to the Navy; it should continue throughout his or her career, and into retirement. We define the Sailor's career using the widely accepted skill competency constructs of Journeyman, Apprentice and Master levels. We feel the continuum should, to a large degree, include Sailors' families, supporters who have implicitly signed on to and serve their nation also.

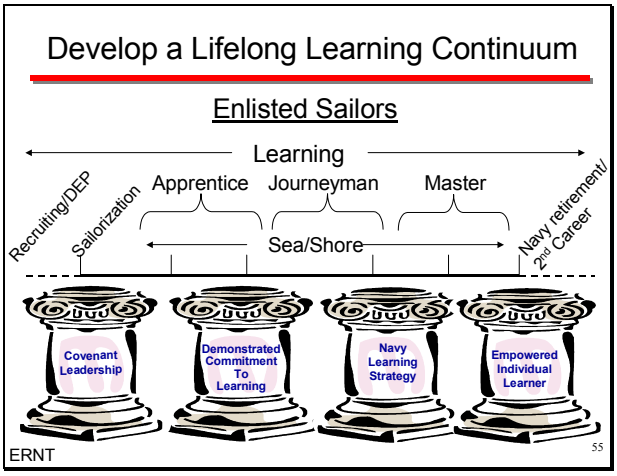

Figure 40.

## Covenant Leadership

Generally speaking, the Navy has benefited from Sailors who had a "sacred" view of a military career, of patriotic service to country. It is a characteristic that provides a deep satisfaction in shared sacrifice. There is an implicit obligation of the Navy organization and its leaders, to provide all hands with the opportunity to achieve their potential, to prosper, to advance, and to truly make a difference while protecting America.

The Navy must provide ample opportunities for every Sailor to grow and prosper. We have presented and discussed many of these issues earlier in the report, but to put the issue in context for the continuum; Navy leaders must be:

- Responsible for subordinates' professional development
- Ensure that training is focused and relevant
- Aggressively eliminate "human wastage"
- Remove obstacle to personal development

- Understand and capitalize on their subordinates' strengths
- Allow an equitable work/life balance
- Provide acceptable work environment
- Balance resources and requirements, and eliminate "message mismatches"

## Demonstrated Commitment to Learning

To successfully implement a *Revolution in Training*, the Navy must demonstrate tangibly, both by action and allocation of resources, that it values training and education. It has been said that for much of the Navy, "If we're not actually in combat, everything we do is training." Even in combat (especially in combat) Sailors must learn and improve their performance. So, training tools and techniques (data collection, debriefings, analysis) will be applied even in combat..

Our report has identified several specific actions which will demonstrate a commitment to learning on the Navy's part:

- Align all training components, facilities and functions
- Avoid "just in time" or "just in case" training
- Recognize and value Sailor education
- Provide appropriate logistics support; maintain training tools in working condition
- Consider human performance in acquisition
- Aggressively identify, adopt and exploit "best practices"
- Design the optimum solutions and media for the given human performance requirement
- Value and reward instructors. Create a culture of "Thousands of Teachers"

## Navy Learning Strategy

The Navy must adopt a learning strategy. We recommend this strategy be based on human performance analysis. It must be the same strategy throughout the Navy, for all warfare communities, for all tasks and skills. As discussed in the 4-Quadrant Human Performance Model, all job requirements should be reviewed and defined by competencies (knowledge, skills, and abilities— KSAs). Training objectives and delivery must be based on KSAs. Having an overarching strategy will significantly alter the way the Navy conducts training today since the focus will be on improving individual skill/job task performance. We feel the Navy Learning Strategy will be manifested by the following actions:

- Implementation of the 4-Quadrant Human Performance Model
- Adoption of the 5-tier Navy Learning Model
- Embracing the Science of Learning
- Developing objective, performance based metrics (level 1-4) at the individual, unit and group level
- Training at locations closer to the waterfront and flight line
- Use of blended training solutions, with different levels of expected performance

## Empowered Individual Learner

The Navy must encourage individuals to be responsible for their own personal and professional development. Individual Sailors must help manage their careers.

Empowering the learner involves ceding some control, over time, and leaving it to Sailors. It is not an issue of simply mandating minimum hours per week in training; it is enabling and rewarding individual learning. It is about providing pervasive access to learning tools and encouraging their use. As seen during our discovery phase, the vast technology infusion associated with NMCI, IT-21 and the internet will fundamentally alter knowledge management

hierarchies in the Navy. Information will flow much more openly, fundamentally altering both individual and command relationships.

The following characteristics would define an "empowered individual learner:"

- Personal responsibility for growth and learning
- A creative vice reactive participant
- Achieving a special level of proficiency
- Living in a continual learning mode
- Enjoying "the journey, not the reward."

## Career Progression

The learning continuum affects each phase of the Sailor's career differently. Our discovery efforts highlighted several new technological applications which were not available even a few years ago. In this section we will highlight someof these tools which we feel would play a significant role in improving a Sailor's career. We will present the enlisted Sailor's career in five phases: Sailorization (which includes recruiting, DEP and boot camp), apprentice, journeyman, master, and post-Navy phase.

## Sailorization (Recruiting, DEP, and Boot Camp) Phase

The continuum starts with the recruiting/DEP phase of a Sailor's career—a phase in which the Navy has traditionally spent very little in terms of education and training.

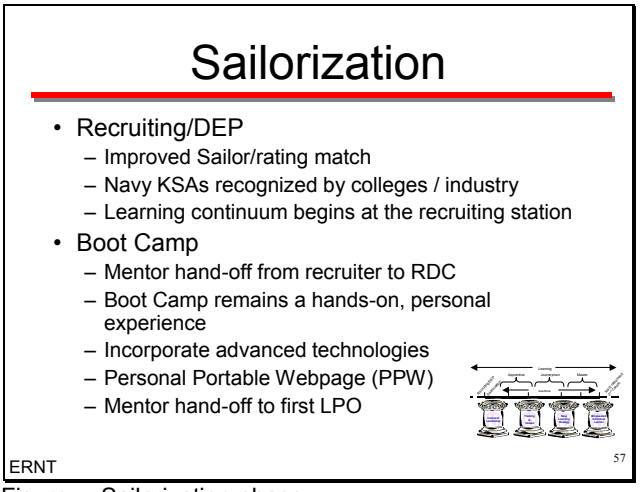

Figure x. Sailorization phase

We recommend the Navy improve the Sailor/rating match. The process must begin with a whole person assessment that encompasses knowledge and academic abilities, job/occupation interests, and current skills. A better match between Sailors' interests and abilities and their ratings will lead to much greater satisfaction and improved performance, and ultimately may reduce attrition and enhance retention.

The Navy currently has difficulty-recruiting civilians who are pre-trained. This is because the Navy does not assess the person's skills against Navy training requirements. For example, individuals who enter with an associate's degree in electronics technology start at the same place in the Navy's electronics technician training pipeline as a new high school recruit who knows virtually nothing about electronics. So the Navy ends up paying for training the individual does not need nor want. When jobs are based on KSAs, the Navy will improve job matches by allowing the direct correlation of civilian competencies with Navy training requirements. This will produce better rating matches, while removing unnecessary and redundant training. If Sailors are to believe that training is important and valued, they must see that *all* training has value, especially the training they have worked to get on their own.

Next we propose that the Navy expand learning opportunities for those in the Delayed Entry Program (beyond the PQS standards that

currently exists). For instance, by making use of the Internet to offer e-Learning, DEPers could begin orientation, academic and technical training before going on active duty. CNA has been conducting an experiment with an internet-based DEP program that allows DEPers to learn PQS material and to take tests on their own time and at their own pace. These learning opportunities appear to have been very productive. If they are, they and should be expanded.

As part of the lifelong learning continuum, we believe that it is important for mentoring to become an integral part of everyone's job. In this spirit, the recruiter – or the Sailor's first mentor- should hand off the recruit to the Recruit Division Commander (RDC) at boot camp. Ultimately, using web-based sites, such as cyber-DEP, an RDC will be able to chat with each of his or her recruits before they ever ship to boot camp. This has the potential to reduce attrition and to enhance the entire boot camp experience.

As always, the main purpose of boot camp is the "Sailorization" process. Therefore we do not expect that major changes will take place in the boot camp process. It will remain to be a hands-on, personal experience, incorporating advanced technologies where appropriate.

At the conclusion of boot camp, sailors will be provided with a Personal Portable Webpage (PPW). Essentially, the PPW is a web page that acts as a professional portfolio and educational portal. The PPW will include an individual's training history, educational transcripts, past and current assignments, important e-mail addresses, bookmarks to important web pages, links to e-Learning and so on.

In terms of career enhancement, the PPW will contain the personal career-planning guide and the learning plan for each Sailor, and will be updated at important career milestones with the Sailor's supervisor/mentor. At each mentor hand off, the Sailor's PPW will also be updated with information concerning recent duty, accomplishments, training, etc., and a revised career plan will be input for the next mentor to use as a reference. The PPW is similar in concept to the personalized WebPages provided through many Internet service providers, such as My Yahoo, or My Lycos.

## Apprentice Phase

We envision the apprentice phase of a Sailor's career to be much more targeted, tailored, and streamlined. It will allow for assessing recruits' KSAs before training begins, and inserting him or her in the right place in the training continuum. Sailors will have much greater opportunities to learn at their own pace, and to take much greater ownership over their learning process.

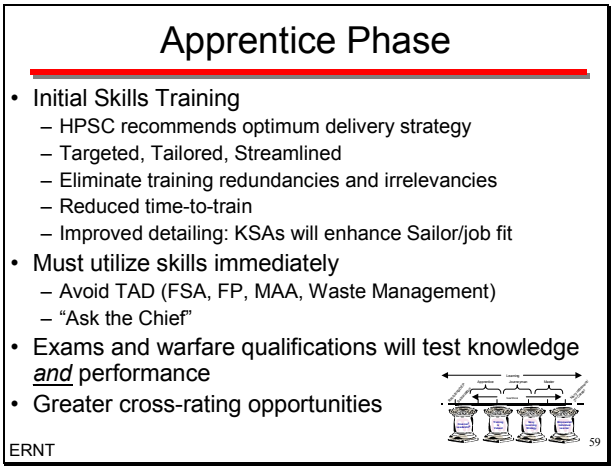

Figure x. *Apprentice phase*

The focus here is on capitalizing on training improvements. Consequently, Sailors' skills must be put to good use. All training needs to be directly correlated to job assignments. That is why the revolution must extend beyond training to incorporate job assignments. Therefore, we strongly recommend that TAD assignments, such as Food Service Attendant, be stopped as soon as possible. One of the top reasons why employees leave companies is the lack of career development. Above all, they value training and education, and desire challenging and rewarding jobs that utilize their skills. TAD assignments run counter to this goal. The science of learning has shown that skills put to use close upon the heels of initial learning are cemented and retained best. Skills which languish during TAD assignments, are surely degraded through disuse.

We also recommend that major changes in the rating exam and warfare qualification processes occur. Specifically, we suggest the evaluation process be based on both the Sailor's knowledge *and* performance, involve simulators, virtual reality programs, and web based applications.

We believe that a KSA-based training and requirements system will facilitate a Sailor's opportunities to cross-rate. Evaluating a Sailor's KSATs allows Sailors to cross rate without having to complete an entire curriculum for a new rating. As a result, the Sailor acquires new skills and the Navy saves training time and money.

Technology offers a tremendous tool to develop esprit-de-corps and professional expertise in common skill areas. We recommend an "Ask the Chief" website be established as soon as possible. This application would be modeled after "Ask Jeeves" (www.ask.com) – a knowledge management website that allows the user to type in a question and submit it to anyone using the site to answer. Answers are rated based on feedback from other users, and a respondent becomes ranked over time by peers. We suggest that such a tool could be invaluable in capitalizing on the knowledge trust that exists within the Navy.

## Journeyman Phase

During this phase advanced skills/knowledge will be acquired both on shore and at sea. The goal is to earn an Associates degree or higher. To obtain an Associates degree Sailors may combine credits earned from formal Navy technical training with credits earned while attending a compressed curriculum program. Sailors choosing this option may return to sea duty earlier—perhaps after one year on shore tour, in exchange for the degree.

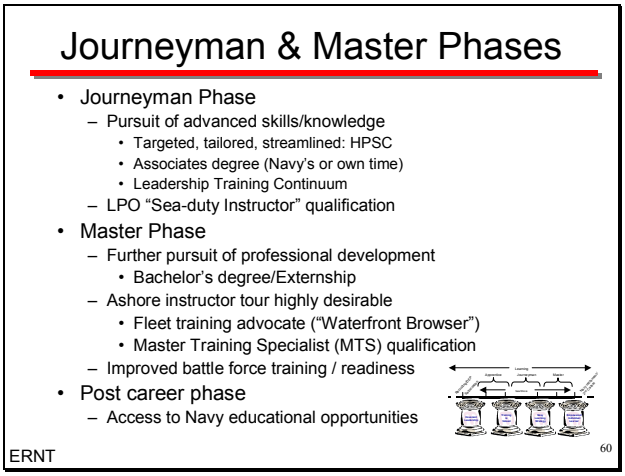

Figure x. Journeyman and Master phases

We also recommend the Navy develop a "Sea Duty Instructor" program. These instructors would complete formal training in the performance consultant arena, and would assist the unit's Chief Learning Officer in the management, coordination, delivery and assessment of command training. This process will provide a cadre of trainers who will be able to assist in administering meaningful shipboard training. It will replace "reading the manual to the division" type training with relevant and engaging training.

## Master Phase

The Master Phase will provide additional opportunities to acquire a college, graduate, and/or professional education. Again, these educational experiences will improve productivity and retention. The concept of externship must also be developed and explored. Externships, in our conception, will give a select group of Sailors the opportunity to work side by side with their corporate counterparts while pursuing industry certifications.

The Master Training Specialist designation should also be touted as a sign of a successful career. This program would continue to develop superior trainers through advanced management and delivery skills training. The program could be further enhanced by specialized training in distributed learning and could conceivably lead toward civilian teaching certification. Master Training professionals would then be sent to

Major Commands and Staffs, like COMTHIRDFLT, COMPHIBGRU 3 or Battle Group/ARG staffs.

So at this point, if we were to review our "Master" sailor's PPW, we would find a complete and impressive list of warfare qualifications, training and education earned over the course of his or her career. On the PPW would also be the personalized Learning Plan, which has been constantly reviewed and updated by the Sailor and a long list of mentors—from his/her recruiter all the way up to Command Master Chief and Chief Learning Officer.

## Post-Navy Career Phase

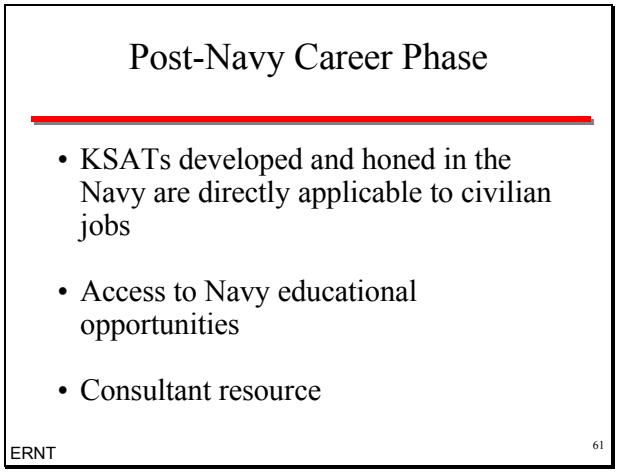


Figure x. *Post-Navy career phase*

The lifelong learning should not stop at retirement from the Navy. The retiree will retain his or her Personal Portable Webpage and access to the Navy eLearning network. These benefits will also extend to family members.

Perhaps most importantly, this transition to the civilian workplace will be enhanced by the Navy's adoption of KSAs. This will allow the Sailor to match their Navy skills with a civilian job.

# Leading Change and Implementation

At this point we should review what we have reported thus far. We have said that a *Revolution in Training* is required because (aside from isolated areas of change) the Navy trains today much as it has for decades. Training is big business for the Navy and is arguably the most important thing the Navy does when not fighting. It must be done as well as possible; it must be done much better that it is today.

Implementation of this change, along with sustaining and developing our learning culture, will be the hardest part of massive organizational change within the Navy. It requires selling the new response, including the case for change, and developing a plan for sustaining and continuing change as the Navy takes advantage of opportunities for continued innovation and transformation. Navy leaders must facilitate an environment of change and win the enthusiasm of their organizations by using every available opportunity to communicate the strategic vision and accelerate change. Leaders can achieve this by communicating the plan and becoming intimately involved in the change process, as well as rewarding and reinforcing successful change initiatives in their commands. Now is the time to make the most of our training resources and to exploit the extraordinary opportunities afforded by new technologies, tactics and technologies from industry and academia. This also is the time to recognize the profound importance of competing in the marketplace for talent. A continuum of lifelong learning and personal and professional development is potentially the most powerful weapon in the Navy's "War for People."

On our journey over the past nine months, we have found the learning tools that are being used by some of the Nation's most successful business enterprises to acquire and retain good people, and to improve profitability. We also have taken lessons from the Science of Learning and related them to Navy issues, learners, and training processes. In the next section chapter we expand on our recommendations once more, so that we can discuss our suggestions for their implementation. At this point we are calling these recommendations the "Essential Components."

We believe that bringing the "Essential Components" into being will require some fundamental shifts in the way that the Navy, as an institution, and Navy people as well, view training and learning issues. Following a discussion of these shifts, we discuss some of the cultural ramifications of the change as well as the need for a subsequent revolution in the manpower and distribution system. It will be up to the Chief of Naval Operations, other Navy leaders and the *Revolution in Training* Implementation Team to create and lead the culture to support the Revolution.

We recommend some early steps; actions we believe will contribute to the beginning of the Revolution, illustrating the kinds of results to be expected, and helping to develop the concepts, processes and organizational approaches. We also recommend here that the Navy adopt "stretch goals" for training and learning, and stretch goals for the effects of the improvements the Navy will undertake in the Revolution. We include some examples of what we have in mind.

Finally, we summarize our proposed changes from what we believe to be the perspective of the learner.

## *The Essential Components*

So, here is a quick recap of our recommendations, before we move on to recommending ways of bringing about these changes:

- Implement a Human Performance System that addresses human performance issues and provides a process for developing solutions and enhancing performance from a systems approach. Utilize the Four Quadrant Model as a process to transform training and learning into a system that provides agile and adaptive alternatives for improving

human performance when training is the answer, or part of the answer to a human performance problem.

- Work with the fleet CINCs to put them (with the CNO, the Director of Naval Reactors, etc) in the driver's seat, and task them to do the job of specifying requirements and accepting or rejecting training outcomes.

- Create the "brain trust," the Human Performance Support Process and Organization that senses the needs, understands the options, and responds to the requirements. Require the expert organization to exploit the marketplace in bringing training solutions to bear on human performance issues.

- In acquisition, require that human performance be a key performance parameter for every phase of the development and fielding of new systems, or major modification to existing systems.

- Place all the factors of production in training and support for Sailor learning in one organization.

- Immediately embark on putting in place the elements of support for the continuum of lifelong learning and personal and professional development for all Sailors (officer and enlisted).

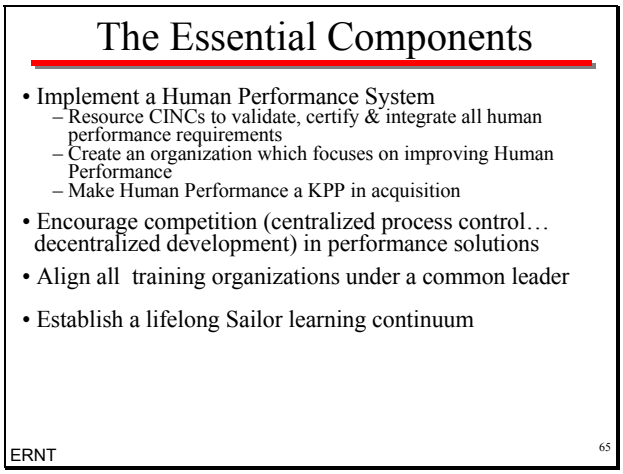


Figure x. *Essential components of the human performance system*

## *The Fundamental Shifts*

Training has a specific and unique role in the maintenance or manipulation of culture. Many corporate values and beliefs are disseminated through training programs, through orientation programs, and systems where new employees are "socialized"—first introduced to the organization's culture. According to organizational behaviorists, shifts in the larger culture influence individuals, who in turn influence organizational culture, which in turn affects organizational structure. In some cases, culture can prevent an organization from adapting rapidly enough to prosper in its external environment.

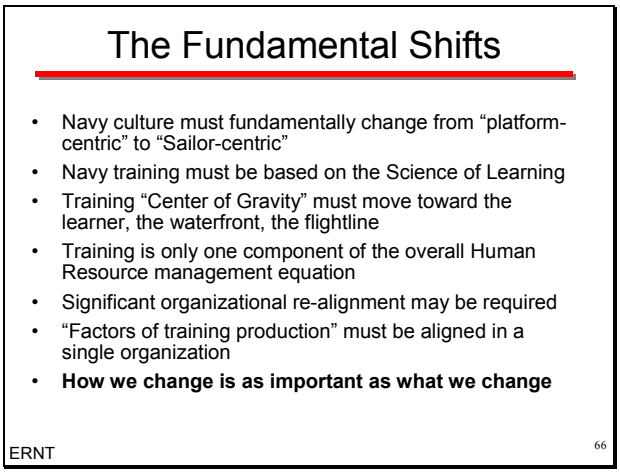


Figure x. *Fundamental Shifts in basic assumptions*

Navy culture has developed and evolved for over 225 years, and has successfully adapted to external stimuli every couple of generations. The Navy is now facing a situation where its organizational culture is at odds with its current environment. The Navy must evolve again. This change is on a par with previous Navy revolutions: the introduction of nuclear power and the All Volunteer Force. Becoming a "Learning Organization" which covets its human capital and encourages life-long learning, personal and professional development is potentially the greatest change in culture. This change will be difficult, and some basic Navy assumptions must be explicitly challenged, concepts which appear to us to have governed Navy's management of its people and training:

- Training is easy—all Sailors are effective teachers.
- Training done outside traditional schoolhouse facilities is of lower quality.
- Specialists are not needed to design and engineer training.
- The Navy must train for every specific job.
- Sailor ratings always match their abilities and interests.
- Occupational standards are accurate and relevant.
- Training requirements forecast 2 to 3 years in advance are accurate.

If the Navy is to become an "Employer of Choice" in the 21st century, the Sailor must become the "customer." People will be the critical resource in the upcoming decades as large corporations recognize human capital as a key resource resulting in a "War for People." Navy "employees" must see clear and important personal benefit to joining, committing, and staying with the Navy. The new dramatically different training approach will focus on the learner, and not be satisfied until the learners' needs have been satisfied and performance has improved to the level required by the Fleet. The fundamental change is rooted in the science of learning, and applying it to teaching, training and supporting the learning of Sailors.

The Navy training system of the 21st Century must be flexible, agile, and self-renewing. It must be responsive to its customers – the Sailor and the Fleet. It must be responsive to the needs of learners and operators, and allow Sailors to arrive at their ultimate duty Station (UDS) as quickly as possible; it must keep them on the job as much as possible. The training structure recommended by the ERNT will relieve leaders in fleet units of today's dilemma: "How do I get my Sailors the training they need, or keep my Sailors onboard, engaged in work that I can't get done in any other way?"

However, improving Navy training is only one portion of the human performance equation. The entire requirements determination, resources, systems development, and manpower allocation process must be improved as a combined system. The effectiveness and efficiency of this system can be improved by realigning Navy organizations that have evolved over time in response to platform and warfare community stimuli, and no to serve the Sailor. Finally, the projected benefits of the Revolution in Training will not all be realized unless the many other manpower, personnel and distribution policies of the Navy also are assessed and optimized.

History and corporate experience indicate the frequent, consistent and visible efforts will be required. Direct, visible and personal CNO/Naval leadership "stakeholder" support is crucial. We should change by building the team, bringing Navy people onboard, testing the ideas, allowing Sailors and DoN civilians to participate and innovate, and making the necessary changes as we understand the consequences. The Continuum, and real changes in the Navy's institutional attitude, will be instrumental in bringing about the Revolution.

## *Changes to Navy Culture*

Shifts of the magnitude we recommend may appear to collide with important components of the Navy "culture." Bringing about meaningful change will depend, in part, on whether the changes appear to be an assault on the culture, or to be a strengthening of that culture. We believe, in all honesty, that the *Revolution in Training* will leverage the strengths in the culture of the Navy, and will derive its power from the underlying appreciation for the value of training in carrying out Navy missions and preserving Sailors' lives.

There are things in the Navy's institutional behavior, however, that have to change with the Revolution. In spite of declaring the importance of training, the Navy has not held leaders specifically accountable for the learning and growth of their subordinates. The Navy also has not utilized the advances in technology that addresses the issues of access and time that

prevent our Sailors from participating in needed training. That must change.

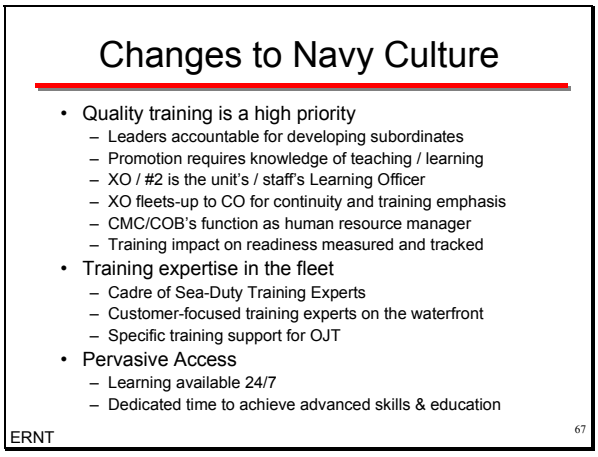

Figure x. *Changes to Navy culture*

We do expect, in a general way, that training will take place in every setting in which a Sailor finds himself or herself. We expect that everyone, from the first-level supervisor through the commanding officer, will contribute to the learning of individuals and teams. The Navy, however, does very little explicitly to equip leaders to be the teachers in an operational setting that it expects them to be. While it will be important to hold leaders accountable for developing their people, things have to happen in the proper order: teach them to be teachers first, then hold them accountable for applying that learning in the work environment to enhance the value of their people.

Two steps can be taken now that will anticipate the effects of the Revolution: First, designate the second in command in all Navy commands and activities the "learning officer." We know; it may just be seen as another duty for an already overworked executive officer. We contend, however, that overseeing the learning of crewmen, teams, and the fighting whole is what the best executive officers do anyway, in support of their Commanding Officers. If the CO is the "mission officer," the XO is the supporting, "learning officer."

The second step is to expand the aviation process of succession to command to other communities. Aircraft squadrons reap real benefits in continuity and stewardship from the fact that the second in command knows from the outset that he or she will succeed to command at the conclusion of the tour of the commanding officer. We believe that these benefits will grow when the second in command is, by billet and title, the leader of the unit's learning efforts. For this reason (and for the advantages of reduction in the retraining of unit leaders, currency with operational employment, and so on), we recommend that the XO/CO "fleet-up" approach be used wherever possible.

Organizations that place a high value on training as a tool successfully reinforce their missions, values, and guiding principles. For the Navy, this is the cultural icon of its identity. Training and culture are inextricably linked, as a change in one will absolutely bring a change in the other. The actions, or lack of actions, taken to improve the Navy's training system will determine how those changes occur.

What about specific support for training conducted by leaders in operating units and shore activities? We make three recommendations that should appeal to leaders who subscribe to the idea that says they already bear considerable responsibility for the learning and growth of their subordinates. First, the Navy should strive to develop a cadre of training expert onboard the commands: "thousands of teachers" our ERNT teammates called them. Through eLearning or other learning media, these people will be the resources at-hand in every teaching and learning situation for the operating forces.

Second, support the learning of these crews and the work of the onboard teachers with experts on the waterfront and at the flight line who are the "front office" representatives of the training establishment. These experts will sense needs for training and respond to requests for help. They will mobilize training forces to satisfy the learning needs and expectations of individual crewmen, teams, and units.

Third, the Navy needs to provide explicit support for the conduct of on-the-job training. OJT is, by all accounts (including our interviews with Sailors), the most effective training that our

Sailors experience. There is great potential to improve that training by focusing on it explicitly during the implementation of the recommendations of the Executive Review of Navy Training.

The last issue with cultural overtones is access to learning. Although there are many parts to this question, we limit ourselves to two. The first is that, to the extent permitted by the nature of a deploying force, access to learning materials, and support for job performance should be continuous. There are technical hurdles here, but in this section we are less concerned with the technical aspects of this than we are with the second issue. That is the attitudes of supervisors and leaders to training and performance support. Learning is an entitlement; growth is a right. Learning on "Navy time" will be a manifestation of proper priorities in managing intellectual capital and leading people. Not everyone would agree today that this attitude is embedded in Navy culture.

## Leading Change

The ERNT team developed a framework for the CNO's vision of a *Revolution in Training* that is manifested in the new Navy learning strategy and the new training continuum. The principal task of the implementation team will be to lead the change to bring the vision to reality. This profound change, which inspires us to think differently and challenges our 225 year old culture, requires a shared Sense of Urgency to ask and answer the questions, "why this and why now?"

The Implementation Team (as part of the Guiding Coalition) will be challenged to sustain this sense of urgency that will require continued engagement with the numerous stakeholders who will be critical advocates. Communicating the plan will be paramount to the success of the revolution in training. A shared vision, avoiding mixed messages, and ensuring everyone in the organization understands "what's in this for me" will be crucial to the success of the effort. Ensuring that the Islands of Excellence (and other programs already under way) persevere as well as empowering innovation at the waterfront, must result in short-term successes that can be built upon. Then, consolidating the gains and sustaining the change and measuring the product of the plan will follow.

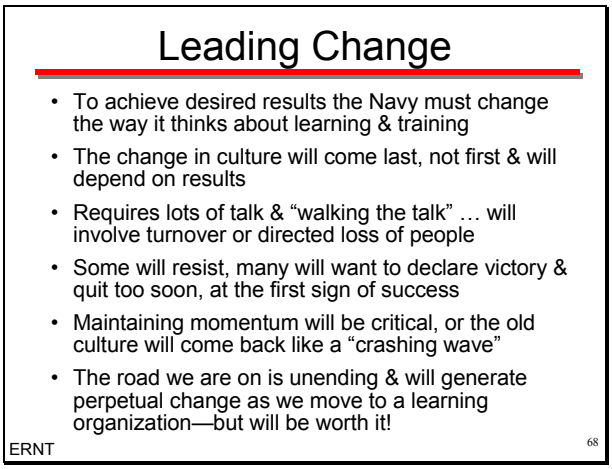


*Figure x. Leading change*

One of the major goals in this phase is to generate more change, accelerate the transformation process, and convert more advocates and thereby get more help. Another goal will be to consider the risks as the overall transformation is led and managed. It will be important to identify, reward, and celebrate successes, without losing the sense of urgency. Many will want to declare victory and quit too soon, at the first sign of success. Leaders at all levels must walk the talk, seek to break down barriers and relentlessly search for innovative solutions and ideas from throughout the organization. Change implementers need to be identified within the various staffs and organizations and provided with the tools and the authority needed to develop transition structures, facilitate communication, and establish reward systems. Change recipients compose the largest group and must not be left out of the process. Feedback and conflict resolution processes and open communications will be required to generate an atmosphere of trust and integrity.

As new practices are grafted onto old ones, they will evolve to replace the old practices. The cultural change will come last, not first, and will depend on results, require lots of talk, and involve the turnover or directed loss of people.

Succession decisions will be critical or the old culture will come back like a crashing wave. This endeavor will be harder than anyone thinks at the outset, but the results will be worth the investment.

From our discussions with Industry and review of the literature (drawing heavily on John Kotter's book *Leading Change*) we recommend the website structure which provides a strategic planning framework, a knowledge warehouse, and a communications vehicle to provide coordination, tracking and execution management.

## *Early (Almost Immediate) Steps*

We recommend that a full-time team be formed quickly to implement the findings of the Executive Review of Navy Training. The Implementation Team should meld the ERNT results with those of the Strategic Studies Group (SSG), the CNO Executive Board (CEB), and other task forces, and use the learning of all of these bodies to launch the *Revolution in Training*.

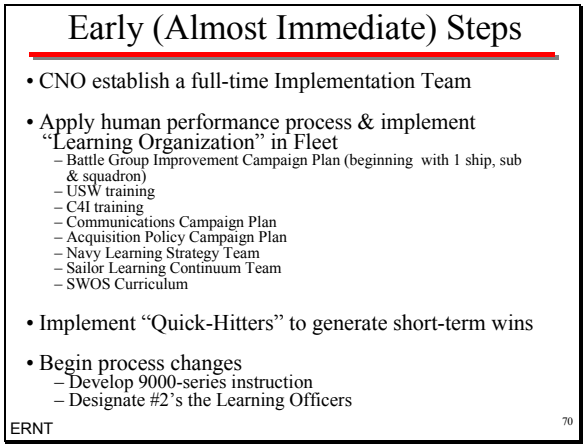

Figure x. *Early implementation steps*

As always, yet as never before, the success or failure of this revolution rests on the shoulders of the Chiefs Petty Officers of the Navy. Ensuring that they embrace the principles of covenant leadership, demonstrate a commitment to learning, and walk the talk daily, is paramount. Singly stated, the revolution is dead on arrival without the enthusiasm, passion, and unwavering support of the CPO community

The team should attack the "Top 5" problems from CINCs, TYCOMs, in order to expend its early efforts in areas with potentially high payoff. Implementation Team members should form multiple, parallel-action teams, including, for example: a performance consultant action group; a fleet-focused action group, a learning continuum action group; a battle group improvement action group; a CINCs support action group; and a resources/sponsorship action group. We say more on these categories below.

Acting rapidly and creating early successes will help build momentum. The ERNT team developed several "Quick Hitters" which could be used to demonstrate the resolve of Navy leaders while producing tangible and visible results. These initiatives include:

- Creating a Personal Financial Management eLearning Course
- Enhancing the Leadership Continuum for Teaching, Training & Learning (emphasizing leaders' responsibility for subordinates' growth)
- Developing a special program ensuring the highest quality officers are assigned as Recruit Training Command Ship Officers in Great Lakes
- Selecting some enlisted Sailors (with quality bachelor degrees) for Navy-funded graduate education
- Undertaking a battle group/ARG "Beta Test" (discussed below)
- Developing a Skills-Based Training Requirements Pilot Program
- Providing e-mail, Portable Personal Web-Page, computer appliances, internet service provider access, and so on for every recruit (and eventually, every Sailor)

- Designating every second-in-command: the "Learning Officer"

We recommend several actions that we believe are important to early testing of the concepts we have developed. It is crucial to demonstrate to all Sailors, especially to senior enlisted leaders and commanders, that there will be payoff for them in areas they care about. Principal among these will be battle group improvement.

We propose working with the fleet CINCs to identify one surface ship, one submarine and one aircraft squadron, all in the same carrier battle group (CVBG), on which to work as much of the "magic" of the Revolution as possible. The CVBG from which the three units come should be beginning the IDTC. After a reasonable period (3 to 6 months?) the CVBG Improvement Campaign should be broadened to the entire CVBG. Lessons learned with the 1,000 or so Sailors of the three units can be applied to the entire CVBG. An enclave should be created around these units to mimic the *Revolution in Training* environment we envision, including mentors, improved OJT, dedicated performance consultants, CINC/ISIC-selected core competencies, Sea Duty Instructors, responsive schoolhouse support, and Personal Portable Pages (PPP) for crewmen.

Selecting and improving specific mission areas, and improving training and performance in key ratings, will be important to learning lessons. The USW mission area, for example, offers a fertile field for development: a highly visible, highly perishable skill with multi-platform applications. Similarly, the IT rating is a key job skill-set in the conduct of C4I operations; the last eight battle groups to return from deployment cited C4I and the IT ratings as the most important training and talent challenge they faced while forward deployed. Emphasizing improving performance in the USW mission area and improving C4I/IT skills would address two of the best and most vital examples of the need to apply new tactics, techniques, and technologies in training.

The Team won't get everything right with CVBG #1, but what they learn can be transferred to a CVBG on the other coast, to the benefit of CVBG #2. After that, we recommend that every tool at the Navy's disposal to improve individual and team performance, and to satisfy the learning aspirations of Sailors, be used to improve every CVBG and ARG working up for deployment.

As soon as possible, the Team should expand the scope of the Training Revolution to include civilians of the Department of the Navy.

Among the topics addressed early in the Revolution should be a "Top 5," to be nominated by the Fleet CINCs, the TYCOMs, C2F/C3F, and so on. Empire Health Choice in New York told us that the most important factor in bringing about real change is: "…keeping a clear sight line between those who will be most important to making the change, and their specific interests, and the solution of their problems."

## Communications input for Final Report

The success of this effort hinges on clearly communicating and marketing what the Revolution in Training is; why it is needed; and how it is going to be implemented. The themes of the communication plan will embrace the ERNT Guiding Principles. To inspire and engage the entire Navy community the plan will communicate how the "Revolution" positively addresses the professional and personal needs and concerns of sailors, officers, and the command structure. The CNO will be strategically employed to initiate and propel the "Revolution." To maintain momentum and engrain cultural changes, the communications effort will aggressively promote program developments through all internal Navy media outlets and select external outlets.

### *Communication/Marketing Plan Goals*

- Explain what the Revolution in training is and how it will positively effect the careers of all Naval personnel.

- Inspire and engage all Navy personnel, from Seamen to CINCs, in the process of revolutionizing Navy training.

- Pave the way for organizational and cultural changes that will propel the transformation of the Navy into an organization that is committed to life long learning

Successfully communicating this vision to Navy and DoD personal is key. The ERNT team "socialized" the issues, concerns and proposals to various members of Navy leadership, but this effort must continue and expand. A dedicated Information Bureau could manage a specially tailored Communications Plan, which includes a pre-launch promotional effort to build interest and momentum, and an official roll-out with a Navy-wide event featuring the CNO and internal media blitz. Immediate and frequent multi-media exposure is paramount, and near-term communications measures should include key congressional leaders concerned with military affairs and Navy issues. Live telecast/web cast with CNO launching the initiative would be ideal; other initiatives could include a CD-ROM that explains program's goals and objectives, monthly web cast with CNO, MCPON, and CNET updating the fleet on initiatives underway and issues to overcome (available both live and on-demand), special articles in professional publications such as Sea Power and Proceedings.

The program should be aggressively promoted through internal Navy media outlets and select external outlets, such as the Navy News Service, Navy & Marine Corps News, All Hands, Navy Times, All-Flag emails & Professional publications (Proceedings, Sea Power, etc.). Finally, a dedicated *Revolution in Training* web-site, populated with appropriate reference documents, etc will provide amplifying information.

## *Set Stretch Goals*

However, the *Revolution in Training* will not be a panacea that solves all the Navy's warfighting capability shortfalls. It is a long-term investment in human performance to improve warfighting capability. Technology is important; it saves money (typically reducing costs 25-33 percent) and improves time utilization ("chunked" training improves access and availability and reduces h/w requirements)

The Navy has much to change, uncontrolled requirement process, substantial redundancy and duplication, a training infrastructure that is platform-specific with excess infrastructure (certainly with investments in eLearning). Navy training methodology has not changed much over the past 20+ years, with a significant cultural bias and reliance on live training; instruction based on "rote memorization"; an acquisition process that does not recognize human resource capabilities; OJT that is not supported, by time or materials.

Unit-level training requirements are unexecutable, "multi-mission creep," ROC/POE, Training Manual, NEC processes are unconstrained. Manpower requirements are based on 1960's methodology, which assumes manpower as a "lesser included consumable." A convoluted organizational architecture poses the rhetorical question: Who has authority, responsibility, and accountability?

The Navy should adopt some "stretch goals" to provide focus. In the next five years, for example, the Navy should strive to be such a good organization in which to learn and grow that "*Fortune Magazine*" will list the United States Navy as one of the top 100 companies to work for in the country. Seventy-eighty percent of the points in the tally leading to that judgment would have to come from Sailors (our employees). That's the way the best employers in the country achieve such recognition. We have listed seven other possible Stretch Goals here by the way of illustration

Figure x. *Stretch goals*

# Summary & Implications

The Navy needs good people to want to join and commit to long and prosperous careers. The Navy must continue to be the preeminent naval force in the world. To attract and retain the best people, and to maintain or increase the lead the U.S. Navy holds over all other maritime forces, Navy training systems must do more than they do today to support the performance of Sailors. Navy training organizations also must be better aligned to do their part in growing high performance Sailors and building unbeatable teams. Training resources, policies, procedures, delivery and measurement systems must be focused on improving readiness. Enriching the learning and intellectual capital of Sailors will be both an integral part of compounding the Navy's combat effectiveness, and ensuring that the Navy competes well in the marketplace for people.

That is not the state of Navy training today. While there are shining Navy examples of the finest training, and organizations that reach out and seize opportunities to grow and innovate, Navy training is weighed down for the most part by antiquated, fragmented organizations, and policies and resources without focus.

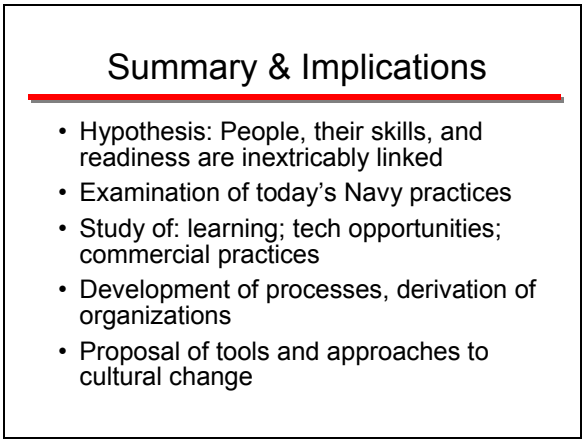


*Figure x. Summary of ERNT review and findings*

We started with the basics. We looked at the way people learn, at the opportunities afforded the Navy by the rapid development in the private sector of new ways of conveying information and knowledge, and at the kinds of agile, responsive, flexible organizations (in use elsewhere and) needed by the Navy to apply these learning advances to the right people, at the appropriate time, in the proper place, for the best effect.

Sailors too often decide to leave the Navy. Soon, when the Navy provides unsurpassed learning opportunities, the decision to leave will be much harder. When struggling with the choice of staying or leaving, Sailors must be reminded of more than sea stories and camaraderie. They must come to believe that no one will ever care more about them than their Navy; that no other profession will be accompanied by as much support for their performance in their jobs; and that nowhere else in the world will their, and their families' learning needs be satisfied as well.

Commercial enterprises are in the midst of a human performance revolution, spurred by focusing on human capital and enabled by the explosive growth of Information Age technology. This revolution will take place, and it will affect Navy training over time, with or without the Navy's deliberate participation. This is the time to embrace it and influence it and bend it to the Navy's purposes.

The time is ripe for change. Navy training is not keeping pace with current system development and acquisition, and the commercial and academic sectors are demonstrating that there are extraordinary opportunities in the powerful alternatives they use to support learning and human performance. The risk of general war is relatively low; this argues that the time for change has come. Sailors expect to learn and grow, and covenant leadership demands that the Navy mature from today's stove-piped, platform-centric "Islands of Excellence" into a newly aligned, agile, responsive learning organization.

Here is a recap of the recommendations of the Executive Review of Navy Training:

**1. Processes:**

- Adopt the 4-quadrant Human Performance Process

- Base training solutions on the 5-tier Navy Learning Model
- View civilian to Sailor Transformation as a single process
- Recognize the importance of a learning continuum

**2. Organization:**

- Align Training Delivery Systems (an Integrated Training Organization)
- Develop a Human Performance Systems Organization
- Create a focal point for training resources on the OPNAV Staff
- Consolidate the Recruiting and Recruit Training Functions under one commander
- Implant a continuum of lifelong learning and personal and professional development

**3. Tools:**

- Develop experts in designing learning solutions
- Exploit the marketplace in developing solutions
- Provide access to learning (and performance support) for Sailors, mentors, and teams
  - Pipes (bandwidth, servers, LANs, ISPs, personal pages, etc)
  - Appliances (computers, digital assistants, EPSSs, JPAs, and wearable hardware)
  - Content (engaging, relevant, flexible material)
  - Time to train
  - Pervasive access to materials (on/off duty, at home)
- Develop waterfront/flight line sensors to assess and meet training and learning needs

**4. Culture:**

- #2s as Learning Officers
- XO/CO fleet up
- CMCs/COBs as learning facilitators and HR managers
- Learning for Sailors on Navy time
- Mentoring with Personal Portable Pages, Personal Learning Plans, etc
- "Thousands of Teachers," a cadre of afloat training specialists.

There are many Human Resource issues that bear on training efficiency, effectiveness, and persistence in important ways, but are beyond the purview of the Executive Review of Navy Training. We recommend that these be studied soon. Further, we recommend that the terms of reference for that study be the same as those for the ERNT: improve combat readiness; win the war for people.

Here are some of those important Human Resources issues:

- OPTEMPO/PERSTEMPO
- Levels of manning in Ships, submarines and aircraft squadrons
- Assignment policies
  - Tour lengths
  - Geographic stability
- Access permitting Sailors to information on availability of jobs and qualifications
  - Job application procedures
  - Policies on formations of crews

- Career policies
  - Matching of individual interests and abilities to Navy specialties
  - Degree of latitude allowed individuals in changing specialties
  - Career lengths
  - Lateral entry (and exit and reentry)
  - Learning incentives (linkage to promotion, compensation, etc)
  - Role of formal education in career management

An Epilogue:

Imagine an Enlisted Sailor in 2027 reflecting on the end of a career that began in 2002.

# Epilogue

Imagine a Sailor in the future reflecting on the end of a different career….

Some 25 years ago the young high school graduate felt valued from the very first experience in the Recruiting Station. The recruiting process was orderly, responsive and most importantly directly relevant to their individual needs. The overall impression was that the Navy was an extremely forward thinking and well managed team, acutely concerned about their Sailors' well being and personal and professional development. The applicant completed a 'Learning Profile, Personality & Interest Assessment' during that first meeting which identified not only what type of learning methodologies were most effective for them personally, but also that they would be most successful in the electronics field. That personality profile was used to select the initial rating and its associated training path, and orders were generated in 30 minutes to start a journey enriched by lifelong learning, individual responsibility, teamwork and, of course, terrific adventures throughout the world. The fact that the recruiter took a direct interest in the new Sailor's needs and concerns highlighted what became a career long theme: proactive mentoring.

The new Sailor already felt like part of the Navy family after the recruiting experience. The Navy *e*-Learning training regimen in the CYBER Delayed Entry Program (DEP) provided early, interactive training in both Navy orientation and basic academic skills which significantly accelerated the acclimation process, and enhanced performance in boot camp. The congratulatory e-mail from the Recruit Division Commander (RDC) one week prior to shipping, for earning 400+ points in CYBER DEP, was a real motivator!

Boot camp had provided all the basic tools to launch a very rewarding and satisfying career. The virtual reality Battle Stations graduation exercise, with scenarios from previous Navy battles, accidents and damage control scenarios, was invigorating and enlightening. Most importantly the Career Training Plan (CTP); the Personal Portable Webpage (PPW) application, with its associated electronic training jackets, education roadmap, personnel files, pay and allowances info, etc.; and the "Welcome to the Navy" video clip from the CNO had fully cemented the limitless opportunities for a motivated Sailor. The direct mentor-to-mentor hand off between the Boot Camp and "A" school instructors had once again highlighted the Navy's commitment to ensure that Sailors had all possible opportunities to achieve their personal goals. As a matter of fact, every PCS transfer had been supported online, with specific command information and virtual tours of the unit and local community, e-mails from Leading Petty Officer, Commanding Officer and Command Master Chief (via the PPW) which had made each move an exciting chapter in the overall Navy experience.

The remainder of the initial training pipeline and first duty station had firmly entrenched the strengths of the Navy training and education system. Superb instructors, self-paced and online instruction, intelligent tutors, interactive courseware (ICW), and rating examinations that assessed the knowledge, skills and abilities (KSA) to perform certain job tasks. No training seemed wasted or irrelevant, and the skills were always focused on improving warfighting effectiveness. It was clearly an agile and responsive training organization, finely tuned by continuous performance feedback and user insights, and always on the leading edge of technology and educational theory. The horror stories about General Military Training (GMT) and On-the-Job Training (OJT) never materialized, and daily tasks were supported by easily accessible tech manuals that presented topics in digestible learning "chunks," very conducive to both rapid troubleshooting and brief learning opportunities during regular work hours. The 24/7 chat rooms and shore browser support center had really cultivated esprit-de-corps among Sailors with similar occupations. Becoming an instructor had been some of the most rewarding milestones during an impressive career. Achieving warfare qualifications, being designated a Master Training Specialist (MTS),

and perhaps most importantly, becoming an At-Sea Instructor, had opened so many doors and opportunities—both in the Navy and more in the civilian world.

The fact that the Navy had valued education had been very fulfilling. Learning really had been pervasive, and fully supported. The vast majority of Navy qualifications had been accompanied by civilian certifications, and the Associates Degree in Electronics Technology awarded by the Navy College Program (NCP) partner college as a result of "C" School had emphasized those opportunities at an early age. Several years of online NCP courses had produced a Bachelor of Science degree at a critical career decision point, and the Navy sponsored masters degree had set the stage for a successful transition to a leadership position in the Navy. Perhaps the most rewarding part was the ability for Navy spouses to directly participate and benefit from the Navy's educational system, and those same services would be able for years to come.

Now, in the twilight of an exceptional journey the Navy's commitment to lifelong learning, to personal and professional development, and to enhance employability at every opportunity, had set the stage for a very successful second career. That leadership covenant had instilled tremendous loyalty over the past 20+ years, making the hard decisions seem easy. Although retirement was soon approaching, there was no doubt that this Sailor would always remain a Sailor in the United States Navy.

# Appendix A: Glossary of Terms

**'A' School**-follow on to RTC, 'A' schools provide initial technical training for a specific rating.

**Attrition**-Most often refers to students lost in training pipelines due to academic, physical, or moral, or self-selected failure.

**'C' School**-higher level rating and type specific school. Fed by 'A' school graduates and fleet experienced Sailors requiring NEC qualification.

**Chief Learning Officer**-the designated and accountable officer charged with ensuring the central tenants of a learning organization are applied throughout a unit's espoused guidance and practiced actions.

**Collaboration at Sea**-utilizes the distributed intelligence within a battle group or fleet through use of wireless communication and interactive computing.

**Cyberdep**-A method for recruiters and RTC division commanders to interface with DEP personnel prior to their entering RTC for training.

**Cybrarian**-manages the educational cyberspace, including the server and functional ends, of the Navy Learning Network.

**Distance Learning**-use of technology to apply numerous methods of instruction, at disparate locations, on demand, twenty-four hours per day.

**eLearning**-24/7 access for Sailors to coursework, lectures, demonstrations and interactive education.

**'F' School**-team training schools conducted in fleet concentration areas e.g. Shipboard Firefighting Team Trainer.

**Human Performance**-integration of learning methods and social action within the context of organizational values, missions, and culture.

**Islands of Excellence**-areas meeting with success developed within the context of a platform centric, stove piped organizational alignment.

**Knowledge Management**-process of attempting to understand and influence how knowledge is transferred, utilized, and renewed.

**Learning Continuum**-an integrative approach to Sailor career and personal development which blends covenant leadership, organizational valuation of education, the Navy Learning Model, and a Sailor Centric structural focus

**Learning Organization**-the product of organizational learning. Characterized by adaptability, flexibility, and valuation of member/client participation in all processes.

**Mentors**-members who act as counselors and surrogate advisors for younger/newer/sub-ordinate personnel and offer advice and assistance on career development and personal growth matters.

**Meta Process-**Overarching strategic process that serves as a guide other included processes.

**Sailorization**-relates to the hand-off of DEP personnel between recruiter and recruit company commander, then between recruit company commander and command master chief and so on throughout a Sailor's career.

**Science of Learning**-industry and academic theories and best practices, which recognize the full range of individual learning processes eg. learning by action, by doing, in addition to the simple lecture and promulgation approach.

**Stretch Goal**-long-term products of implementation of organizational learning practices, a Sailor-centric learning continuum, and a revitalized culture fostering innovation and agility throughout the Navy.

**Thousands of Teachers**-developing a culture where all members consider themselves and act as teachers to all other members in job tasks, career development and personal growth.

**Transformation Command**-A single command under the Chief of Naval Personnel, responsible for transformation of civilians into Sailors through authority over both Navy Recruiting Command and Navy Recruit Training Center(s).

**Use Cases**-The method utilized by the ERNT to test the 4-quadrant model with real world scenarios.

**War for People**-the struggle between employers (government, commercial, and non-profit) to recruit and maintain talented labor.

# Appendix B. Acronyms

**AC-**Active Component

**ACAT**-Acquisition Catagory

**ACTC**-Air Combat Training Continuum

**ADL-**Advance Distributive Learning

**AEC**-Automated Electronic Classroom

**AFQT**-Armed Forces Qualification Test

**AVF**-All Volunteer Force

**ARG-**Amphibious Ready Group

**ASN-RDA**-Assistant Secretary of the Navy for Research, Development and Acquisition

**ASW (USW)-** Anti-Submarine Warfare(Undersea Warfare)

**ASTD**-American Society for Training and Development

**ATRC**- Aegis Training Readiness Center

**AT/FP**-anti-terrorism/force protection

**BG**-Battle Group

**CBT**-Computer Based Training

**CEB**-CNO Executive Board

**CINC**-Commander in Chief

**CEO**-Chief Executive Officer

**CIC**-Combat Information Center

**CLO-**Chief Learning Officer

**CMC**- Command Master Chief

**CNA**-Center for Naval Analyses

**CNET**-Chief of Naval Education and Training

**CNO**-Chief of Naval Operations

**CNP**-Chief of Naval Personnel

**CNRC**-Commander Navy Recruiting Command

**CO-**Commanding Officer

**COTS/NDI-**Commercial off the Shelf/Non-development Items

**CPO**-Chief Petty Officer

**CVBG-**Carrier Battle Group

**C1-**Mission Capable

**C3F-**Commander Third Fleet

**C4I-** Command, Control, Communication, Computers, and Intelligence

**C4ISR-**Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

**DL**-Distance Learning

**DEP-**Delayed Entry Program

**DSB-**Defense Science Board

**DoN**-Department of the Navy

**DT/OT**-Development Training/Operations Training

**EPSS**-Electronic Performance Support Systems

**ERNT**-Executive Review of Navy Training

**FCA**-Fleet Concentration Area

**FCTCPAC**-Fleet Combat Training Center Pacific

**FYDP**-Five Year Defense Plan

**GCCS**-Global Command and Control System

**GMT**-General Military Training

**HPSM-**Human Performance systems Model

**HSI**-Human Systems Integration

**IA**-Individuals Account

**IETMS-**Interactive Electronic Training Manual

**IDTC**-Inter-Deployment Training Cycle

**IMAT-**Interactive Multi-Media Acoustic Trainer

**IPT**- Integrated Process Team

**ISIC-**Immediate Superior in the Chain of Command

**IST-**Initial Skills Training

**IT**-Information Technology

**IT/SEC-**Inter-service Training/Simulation and Education Conference

**JMETL**-Joint Mission Essential Task List

**JROTC**-Junior Reserve Officer Training Corps

**JO**-Junior Officer

**JPA**-Job Performance Aides

**KSAT**-Knowledge, Skills, Abilities, & Tools

**KPP-**Key Performance Perimeters

**LOS**-Length of Service

**LPO**-Leading Petty Officer

**LTA-**Local Training Authority

**MCPON**-Masterchief Petty Officer of the Navy

**MC**-Mission Capable

**MOE/MOP**-Measures of Effectiveness /Measures of Performance

**MNS**-Mission Needs Statement

**MPN**- Military Pay Navy

**MTS**- Master Training Specialist

**NAVMAC**-Navy Manpower Analysis Center

**NAWC-TSD**-Naval Air Warfare Center-Training Systems Division

**NCF**-Navy College Fund

**NEC-**Navy Enlisted Classification

**NTSP-**Navy Training Systems Plan

**N79-**OPNAV code designating the director of Navy Training

**N779**-Director of Submarine Training

**NMCI**-Navy and Marine Corps Internet

**NMETL**-Navy Mission Essential Task List

**NPS**-Naval Post Graduate School

**NSAWC**-Naval Strike Air Warfare Center

**N9**-OPNAV code designating a notional staff working for the CNO

**OCCSTANDARDS**-Occupational Standards

**OJT**-On the Job Training

**OPN**-Other Procurement, Navy

**OPNAV**-Office of the Chief of Naval Operations

**OPTAR**-Training command Operating funds

**OPTEVFOR**- Operational Test and Evaluation

**ORD**-Operational Requirements Document

**PM**-Program Manager

**PPP**-Personal Portable Page

**PPW**-Personal Portable Web Page

**PQI**-Performance Quality Index

**RC**- Reserve Component

**RDC**-Recruit Division Commander

**R&D**-research and development

**ROC/POE**-required operational capability/projected environment

**ROI**-return on investment

**RTC**-recruit training center

**SELRES**-Selected Reservist

**SUBNET**-Submarine Network

**SORTS-**Status of Resources and Training System

**SSG**-Strategic Studies Group

**SYSCOM**-Systems Command

**TAD**-Temporarily Assigned Duties

**TYCOM**-Type Commander

**UDS**-Ultimate Duty Station

**UI-**Under Instruction

**VCNO**-Vice Chief of Naval Operations

**VolEd-**Voluntary Education

**VR**-Land based logistics air transport

**XO-**Executive Officer

**6YO-**Six-year Obligator

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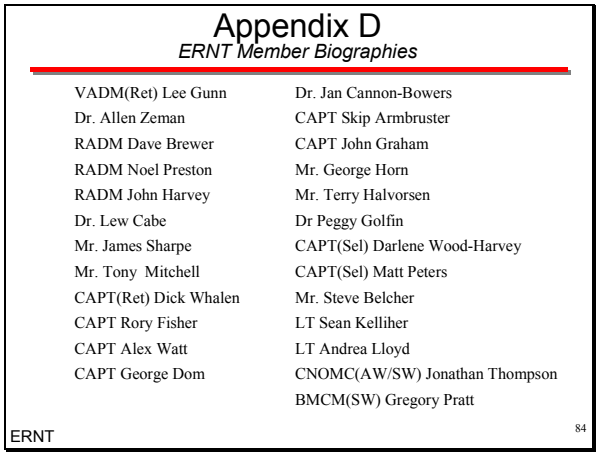
# Appendix D ERNT Member Biographies




VADM(Ret) Lee Gunn - Director, Executive Review of Navy Training. Former Inspector General of the Department of the Navy, and Commander Amphibious Group THREE, Commander, Combined Naval Forces, and Deputy Commander, Combined Task Force United Shield. Director of Ship Operational Characteristics Study (1987-88). Commanding Officer of *USS Barbey* (FF 1088). Assistant Chief of Staff for Operations, Plans, Training and Readiness on the staff of Commander, Naval Surface Combatant Task Force, and Commander Logistics Force, Seventh Fleet. Commander Destroyer Squadron Thirty One. Eight manpower, personnel and training billets in the Bureau of Naval Personnel and on the staff of the Chief of Naval Operations. Masters of Science, Operations Research and Systems Analysis, from U.S. Naval Postgraduate School and is a graduate of the National War College.

Dr. Allen Zeman – Director of Naval Training and Education (OPNAV N79). Directed The 1996 Department of the Navy's Quality of Life Comprehensive Assessment and the 1996 Pre-Service Arrest History Task Force. Participated in many studies including CNO and JCS individual Personnel Tempo and work for the Assistant Secretary of the Navy (Manpower and Reserve Affairs) as the Director of Manpower and Training. Former CNA analyst assignments included several manpower studies on officer manpower modeling, incentive program designs, and aviation career paths. Field position with Amphibious Group THREE. PhD, Economics, Florida State University.

RADM Dave Brewer – Vice Chief of Naval Education and Training. Former Commander Amphibious Group THREE. Former Commander U.S. Naval Forces Marianas/ Commander in Chief , U.S. Pacific Command Representative Guam/ Commonwealth of the Northern Marianas Islands/ Federated States of Micronesia/ Republic of Palau. Former Special Assistant for Equal Opportunity to the CNO. Commanding Officer of *USS Mount Whitney* (LCC-20) and *USS Bristol County* (LST-1198)

RADM Noel Preston – Head, Aircraft Carriers Programs Branch and Head, Aviation Manpower and Training. Former Deputy Commander, Joint Task Force Southwest Asia Member of Secretary of the Navy's National Naval Reserve Policy Board. Former Commanding Officer of HS 1535, HS 75, VTU 0881, NR ABFC FMP MMF A, and COMUSNAVCENT 108. MBA in Accounting from University of Pennsylvania's Wharton Business School.

RADM John Harvey—Director, Total Force Programming, Manpower and Information Resource Management Division (N12). Acted as Commanding Officer of *USS David R. Ray* (DD 971) and *USS Cape St. George* (CG 71). Masters Degree in Public Administration from John F. Kennedy School of Government, Harvard University.

Dr. Lewis R. Cabe; Senior Vice President for Business Operations, The CNA Corporation (CNAC), Formerly held positions: Director, Institute for Public Research (IPR) a division of CNAC; Director, Federal Programs Division, Center for Naval Analyses (CNA); Director Manpower and Training, CNA; Director Program Analysis, CNA; Executive Director Defense Resources Management Education Center, Naval Postgraduate School; Director Special Studies, Office of the Assistant Secretary of Defense; Career Army officer with

specialty in logistics operations/management and operations analysis; PhD, Business Administration, University of Alabama.

Mr. James Sharpe – Director of eLearning for IBM's Learning Services Group. Leads IBM's Worldwide Technology Strategies, Worldwide e-Learning Technologies Competency Segment, and Second-Line Systems Integration and Worldwide Asset Development. He is also a Product and Services Integration Consultant to Lotus Development Corporation. B.S., Mechanical Engineering, Purdue University.

Mr. Tony Mitchell –Vice President/ Chief Learning Evangelist Ninth House Network. Responsible for working with Fortune 500 and US Government clients from conceptualization and strategy through deployment. Prior experience includes President of SalesKit Software Corporation. He has over 12 years experience delivering large scale change management and software solutions. B.A. in History from Washington and Lee University.

CAPT(Ret) Dick Whalen – Director of Military Activities, Old Dominion University, Norfolk, Virginia. Former Surface Warfare Officer and Education/Training specialist. Commanding Officer of USS Thomas C Hart (FF 1092) and commissioning Commanding Officer of Aegis cruising USS Mobile Bay (CG 53). BUPERS Director of Subspecialty Development, NMPC Deputy for Procedural Control. Naval Academy Director of Professional Development, Deputy for Manpower and Operations, U.S. Atlantic Command. M.S., George Washington University.

CAPT Rory Fisher – Program Manager, Aviation Training Systems (PMA 205). Prior assignments include Assistant Deputy Commander for Program Support, Naval Air Systems Command, Group Head for Program Management and Military Director of Research and Engineering for Naval Air Warfare Center, Aircraft Division (NAWCAD), Patuxent River, and Commanding Officer of Patrol Squadron FORTY-EIGHT. Master of Science Degree in Anti-Submarine Warfare Systems Technology at the Naval Post Graduate School.

CAPT Alex Watt – Commanding Officer, Fleet Training Center, San Diego. Former assignments include: Commanding Officer, Fleet Combat Training Center, Pacific, San Diego. Operations Directorate, US Pacific Command, Honolulu, Commanding Officer *USS Ouellet* (FF 1077) Surface Readiness Officer CINCPACFLT. Instructor tour include Engineering and Tactical Maneuvering Instructor at the Surface Warfare Officer's School Basic, Newport, RI, and the Spruance Class Destroyer Engineering Course, Director/Senior Instructor. B.S., University of Notre Dame.

CAPT George Dom - Commander, Carrier Air Wing Seven. Previous tours include: Commanding Officer/ Flight Leader of the Navy Flight Demonstration Squadron (Blue Angels), Commanding Officer of Strike-Fighter Squadron 37 (VFA-37), Instructor at the Navy Fighter Weapons School, "Top Gun," at NAS Miramar, California, and Department Head of Strike-Fighter Squadron 82 (VFA-82), aboard *USS AMERICA* (CV 66) for Operation Desert Storm Graduate of the National War College.

Dr. Jan Cannon-Bowers – Senior Scientist, Science and Technology Division, Naval Air Warfare Center Training Systems Division. Program Chair, Division 14, American Psychological Association Meeting, Navy Research Advisory Council member, Office of Naval Technology Manpower R&D Committee, U.S. Representative, NATO Research Study Group on Decision Support System Design. Ph.D. Industrial/Organizational Psychology, University of South Florida.

CAPT Skip Armbruster- Project Manager Job Tasks Analysis, C4ISR/IO Logistics Directorate on Training Issues, Space and Naval Warfare Systems Command. Prior reserve assignments include Training Department Head and Manpower and Training Readiness for Commander, Submarine Force Pacific. Civilian work experience includes Mechanical Engineer and Design Specialist for Science Applications International Corporation (SAIC). Qualified Submarine Warfare Officer. Masters of Science Degree in Mechanical Engineering from San Diego State University.

Mr. George Horn – Head, Undersea Training Section (OPNAV N879C & OP-290). Prior positions also include Program Manager for Guided Missile School, Dam Neck and Submarine School, New London. Worked in the Naval Training Publication Center on Submarine Training Plans and was a former Captain in the U.S. Army. Graduate of Florida Southern College.

Mr. Terry Halvorsen – Director, Assessment Division Chief of Naval Education and Training. Former CNET Training Standards Officer, and Deputy for Intelligence/Communications and Training, Training Performance Evaluation Board Member, Training Director Naval Technical Training Center Pensacola Florida.

Dr. Peggy Golfin – CNA analyst and project director, Workforce, Education and Training Team and Scientific Analyst to Commander, Navy Recruiting Command. Over 12 years of experience in social science research. Ph.D from Cornell University in Agricultural Economics.

CAPT(Sel) Darlene Wood-Harvey – Resource Sponsor for Information Technology (IT) Training (OPNAV N642). Prior assignments include Commanding Officer, U.S. Naval Computer and Telecommunications Station, Far East, Commander Naval Forces Japan's (CNFJ) Regional Information Technology Coordination (RITC), and Assistant Chief of Staff for Communications (N6), and Deputy Program Manager for a Joint C4I Modernization Plan. Graduate of the Air War College and has a Master's Degree in Business Management from Golden Gate University.

CAPT(Sel) Matt Peters - Training and Education Integrated Warfare Architecture (IWAR) Team Leader. Former Commanding Officer VP-9. Two tours in operational analysis with N81 Program Appraisal Division. Masters of Business Administration from Marymount University.

Mr. Steve Belcher – CNA Analyst and project director, Workforce, Education and Training Team, Support Planning and Management Division. Former Analyst, Submarine and Antisubmarine Warfare Department. Member of the Navy's 1993 Base Structure Analysis Team. Field representative to the Third Fleet Tactical Analysis Team. Former analyst, Submarine and Antisubmarine Warfare Department. M.S. in Geophysics from Virginia Tech.

LT Sean Kelliher – Assistant Department Head, Joint and Contingency Temporary Duty, (OPNAV N123C). Former Joint Officer Management Analyst at Bureau of Naval Personnel (PERS 45J) and Joint Officer Policy Analyst for Chief of Naval Operations (N123J). Masters of Science in Strategic Intelligence from the Joint Military Intelligence College.

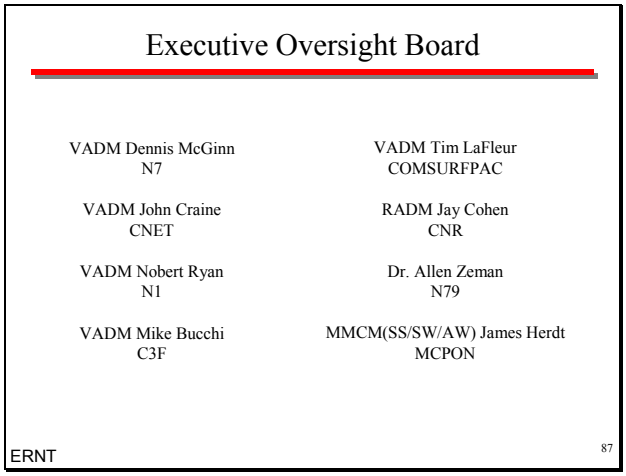
LT Andrea Lloyd – Military Assistant to the Director of Naval Education and Training (OPNAV N79). Former Assistant Division Officer of the Mother and Infant Care Center at National Naval Medical Center. Former cryptological technician (Maintenance branch) and instructor at NSA. M.A. in Organizational Management from George Washington University.

CNOMC(AW/SW) Jonathan Thompson – Command Master Chief, Naval Training Center Great Lakes. Prior Command Master Chief tours on USS Pensacola (LSD-38), for Commander, Carrier Air Wing Three, and Commander, Second Fleet and Striking Fleet Atlantic. In addition he also served on the USS America (CV-66) as the Air Department Leading Chief and as a Recruit Division Commander at Recruit Training Command, Great Lakes. He was also an instructor at the ABH School and an "A" School course supervisor. B.S. from Southern Illinois University.

BMCM(SW) Gregory Pratt - Force Master Chief for the Chief of Naval Education and Training. Recent assignments include Command Master Chief of Chief of Naval Air Training Command, Command Master Chief of USS Chandler (DDG-996) and LCAC Craftmaster with USS Rushmore (LSD-47) for Operation Restore Hope and with USS Essex (LHD-2) for Operation United Shield. "Distinguished

Graduate" of the Navy Senior Enlisted Academy.

# Executive Oversight Board




At various times throughout our 7 month study we were aided by discussions and insight gained from the ERNT's Executive Oversight Board. The eight members of this group met with the ERNT working group at regular intervals in the study to review work in progress and to add their knowledge, experience and perspectives. Their contributions were of great benefit to the working group and instrumental in our journey of discovery and understanding.

The Executive Oversight Board had as members:

- VADM Dennis McGinn, Director Warfare Requirements and Programs (OPNAV N7)
- VADM John Craine, Chief of Naval Education and Training (CNET)
- VADM Norbert Ryan, Chief of Naval Personnel (N1)
- VADM Mike Bucchi, Commander, Third Fleet (C3F)
- RADM Tim LaFleur, Commander Surface Forces Pacific (COMSURFPAC)
- RADM Jay Cohen, Chief of Naval Research (CNR)
- Dr. Allen Zeman, Director of Naval Training and Education (N79).
- MMCM(SS/SW/AW) James Herdt, Master Chief Petty Officer of the Navy (MCPON).

# APPENDIX E ERNT INDUSTRY & MILITARY SITE VISITS LESSONS LEARNED

**IBM** – 360,000 employees

- Values intellectual capital. Top leaders have personally committed to e-learning with:
  - Live video training,
  - Knowledge nuggets,
  - Internal web-based training network featuring Personal Portable web-pages, lectures, courses, collaborative and distributive learning,
  - Web-based training (WBT),
  - Classroom training,
  - Self-study workbooks, audio/video training,
  - Video tape w/ workbook, and
  - Computer-based training (CBT)
- Adopted a 4-tier learning model designed to deliver training to the learner in the optimum media. Results in the development of blended solutions for training requirements.
- Adopted performance consultants to evaluate job requirements.
- Rapidly adopting e Learning. Converting quickly, but initial products were adjusted because they fell somewhat short (in IBM's view) of meeting high priority customer needs.
- "Brick and Mortar" training still important. Despite e-Learning focus, over 50% of all training still conducted in traditional classrooms.
- Time is not provided during work-hours to train. Employees' own responsibility.
- Knowledge Factory. 90 days to identify requirement, build and test product, and field to entire organization.
- Human performance study is necessary. Human performance specialist should become more? Behaviorist, Sailor-centric approach. Come up with analytically derived solutions to real problems. What is the creative part: develop options in HP. There is not an all-purposes HP specialists/team in the Navy.
- Industry is measured on cost avoidance.
- Have not implemented level 3 and 4 MOE. Measures of effectiveness are not used pervasively in industry.
- Understands how information flows and tweaking the organization.

**Ford Motor Company** – 319,000 employees

- A change-savvy organization
  - Survived World War I, World War II, Depression, the 1960's –70's and 80's, and the Information Age.
  - "Success is the only way to change the culture."
- Centralized, profit-based training organization which develops and fields training solutions in response to corporation developed requirements.
- Adopted Performance Consultant concept in recent past, with centralized "hub & spoke" structure.
  - Performance consultants a mixture of traditional Instructional Systems Design (ISD) professionals with expanded training, and subject matter experts with HR training

- Attempting to correlate training to "Share Holder Value," i.e. stock price (level 4 MOE)

- Attempting to shift to Total Ownership Cost (TOC) measurement of training intervention (i.e, including infrastructure, manpower, etc)

- Team training emphasized on production floor.

  - Teams responsible for the development of new team members

  - Team leaders receive instructor and mentoring training

  - "OJT" focused

- Ford Virtual Learning Network. An internal web-based personal training management system.

- Skill-based job competency foundation to allow mentoring, job improvement and long-range personal development programs.

- Corporation funded graduate education programs.

**CISCO**

- Significant investment in e-Learning (50 percent learning on line). Decentralized pricing. Competitive market based model.

- Corporation's Guiding Principles driven into corporate culture. Every employee carries card.

- Developed tools. When a salesperson has to be called back to corporate headquarters it costs 12,000 dollars.

- Chunked learning modules.

- Personal, portable, web-page with access to all training tools. Personal training accounting with immediate feedback.

- Time is not provided during work-hours to train. Employees' own responsibility.

- Support of the CEO is critical to get the culture to change.

- Can't guarantee your employment, can guarantee your employability.

- Direct access to view the message from CEO.

- Individual divisions are not required to purchase Ford's training department's solution. Able to meet need via local industry – forces competitive marketplace dynamics.

- Majority of ISD, curriculum development and instructors are outsourced.

**Oracle**

- Marshals all web tools to support employee learning

- See support for learning as investment in human performance and intellectual capital

- Corporate theme: Oracle's obligation is to "keep its members employable, not employed"

**9th House**

- Cutting edge.

- Development teams include IT subject matter expert, who does not necessarily have overriding vote.

- Try to measure training – top end solutions. Myers-Briggs employed to refine modes for learning.

- Assigned Mentor. Online mentor. Intelligent tutors. The ability to track centrally all forces who use there product. Centralizes fields and personalizes them for individual needs. Tailored, scalable training.

- Uses the power of the story telling ("*Fools Gold*"). Immersion. Supervisor knows what is being done.

- High Quality, Hollywood scripting and filming gives real-time feedback.

### Circuit City

- Adopted e-Learning to "survive." Employee training to support rapid product introduction could not be met via tradition centralized classroom instruction (more products introduced in past 2-3 years than in the last 50-years).

- Able to directly correlate training to "bottom line." Sales staff productivity mapped to training investment over first three years. Employees are held personally accountable for training.

  - Linked e-Learning attendance to learning curve

- e-Learning provided as "chunked learning" opportunities which can be easily completed during the standard workday.

- e-Learning transition was not initially successful. Voluntary compliance not timely or effective in implementing change.

  - Senior Vice President (Chief Operations Officer) assumed the lead and personally visited every store.

  - Training became mandatory, and training progress monitored by headquarters. Sales staff and associates 'locked out' of cash registers by central headquarters until appropriate training modules completed.

- Company did not adopt e-Learning to save money, but recouped initial investment in four months.

  - Outsourced e-Learning development. Does not own any infrastructure.

  - HR VP "blown away" by amount of data generated by eLearning + big impact on HR and culture.

### Empire Health

- Significant change: non-profit to profit company.

- Direct, personal senior leadership involvement viewed as key to success. Buy-in from organization's top leaders was absolutely required.

  - Changes in leadership were needed to bring about change

  - Maintains sense of urgency

  - Monthly brief to CEO on status and where they are going

  - Change is "on track"

- Developed detailed plan of action and reporting system. Senior management meetings are broadcast for everyone to see

- e-Learning part of change, but overall culture changed as well

  - Moved past e-Learning to mass communications system.

  - Live streamed video of meetings; cell phones are part of meeting – allowing immediate subordinate input

  - More horizontal structure. Subordinates now communicate with middle and upper level managers directly through e-system.

- Important to develop and maintain a direct sight line between training and key parameters of the company. Empire focused on customer service and ability to provide real time feedback on claims process and customer call levels.

- The momentum must continue for success to occur.

- Focus on human performance vice simply training requirements. Educate the customer! Customers set the requirements.

- Must rapidly prototype and develop solutions. Write, and launch the 85 percent solution.

**Idaho National Energy Engineering Laboratory (INEEL)**

- Looking at tying performance to curriculum development

- Control of hazardous material

- Have the capability to develop high end learning media

- Government agency, willing to help out. DOE affiliate

**Chief, Naval Education and Training (CNET)**

- Exceptionally large and dispersed organization, but does not own or manage all of Navy training.

- Lots of individual areas of excellence.

- Leveling benchmark of depth and scope.

- Lots of initiatives some well researched.

**Naval Postgraduate School Center of Executive Education (NPS/CEE)**

- ERNT's first prospective on how corporate leaders are handling change.

- Helped develop our "Learning Officer" concept

- Appreciative inquiry incorporated extensively

**Naval Air Warfare Center- Training System Division (NAWC-TSD)**

- Only systems command laboratory specifically chartered to do Navy training. Although functionally subordinate to aviation community, also supports surface and submarine communities. Maintains effective liaisons in joint and civilian arenas.

- Mission funded as well as DBOF, which improves flexibility to meet emergent requirements

- Leading edge technology arena

- Thought leaders for the Navy. Example of training issues dominating community issues. Examines training from corporate viewpoint, with blended and joint solutions

- Center of Excellence for advanced simulations.

- Only Navy laboratory that does front end training analysis.

**Duke Energy**

- Human performance consultant roles. Consultants would match the specific problem. The most similar to the Navy. Many former Navy Sailors on their team

- Operating side of the nuclear component went to performance consultants to increase efficiency and save money. Human performance ideas applied in a new way. Combined with training for a new approach. In depth experts consulted in technical area. Cadre well versed in all solutions. People have to have contract knowledge. Grow HP from technical and academic background as well as from HR.

- Performance consultants matched field with customers' needs . All employees are on line and networks are linked to benefit selection.

**Tennessee Valley Association (TVA) University**

- Resistance to change and performance measurement to be expected.

  - Cannot punish the measurer or the person being measured

- Zero-defect mentality must be removed
- Don't punish people for showing deficit
- Open culture is imperative

- Level one measurement analysis is often used for dead reckoning feedback.

- Organizational learning vs implementation. First time actions do not meet words there will be resistance.

**OSD Advanced Distributed Learning (ADL) CoLaboratory**

- Learning objects. Point of contact/action for OSD on Sharable Content Object Reference Model (SCORM). Estimated $100M+ savings due to e-Learning. CoLab rule to thumb: e-Learning yields 1/3 savings and 1/3 improvement in results or 1/3 reduction in time to train.

- High level DoD support for ADL initiatives.

- Set high expectations, but do not be unrealistic.

- Potential for e-Learning is one standard deviation improvement in student performance

- Sets policy and provides advice, but lacks the "forcing function" to ensure compliance on standardization issues

**Naval War College (NWC)/Strategic Studies Group (SSG)**

- Organizational alignment very important

- Increasing importance of human capital

**Naval Undersea Warfare Center (NUWC)**

- DBOF funding

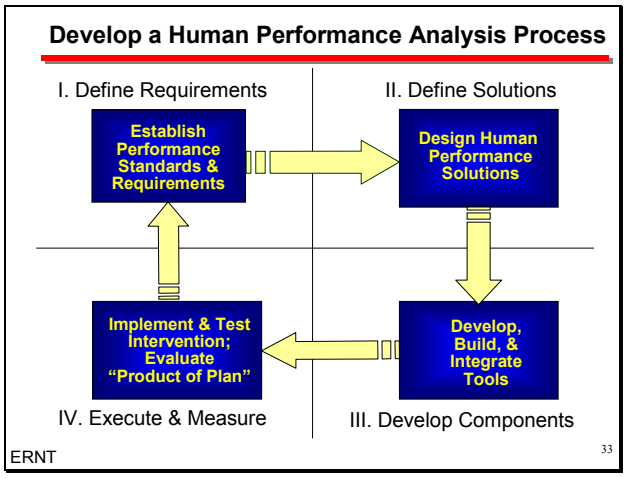
- Center of Excellence for technology infusion and enthusiasm

- Development of terrific training tools, but products lack validated requirements and life time logistics support

- Confirms that training system needs to be aligned. Great initiatives developed and exercised somewhat in isolation. Efforts of laboratories in training not coordinated among sponsors. Labs unable to capitalize on each others' work.

# Appendix F: Description of the Human Performance Process Model

For the Navy to gain competitive advantage in technical training and address its human performance problems, we must first develop a process by which the Navy can turn critical information into a shared knowledge and value base. We define a formal process for human performance as a cyclical model that defines human performance requirements, establishes how best to achieve this performance, develops the necessary tools or products, implements the solution, and provides feedback based on an evaluation of the outcome. By creating a process, our training system can function while continually learning, adapting, and rejuvenating itself. This leads to an improved organizational problem-solving ability and capacity for action. To fully exploit organizational knowledge, this process will build on collective knowledge and experience, based on organizational memory dependent on institutional mechanisms (e.g., policies, strategies, and explicit models) used to retain knowledge. It also allows our training system to continually transform itself to better manage knowledge, utilize technology, empower people, and expand learning to better adapt and succeed in the Navy's challenging environment.




We developed a human performance analysis process around a four quadrant model (see chart). The process begins in Quadrant I by generating human performance requirements. Requirements are expressed in terms of what human operators are expected to do, and not in the current practice of using terms of training that drive to a particular solution. For example, the current practice allows stating the requirements like, "provide a training course in C-school for missile operators." In this case, the requirement is stated in such a way as to preclude a human performance assessment, and drives directly to a specific solution (a training course). In contrast, our new concept allows requirements to be expressed in terms of what the human operator (or team) needs to do to accomplish the job or mission—for example, "the operator must be able to shoot a missile within 30 seconds." Stated in this way, the requirement does not pre-determine a solution; rather, it states a human performance target that may be met in several ways. More importantly, it allows for an appropriate analysis to be conducted so that an optimal solution can be devised. Quadrant II describes the solution building process. As human performance requirements are established, they move to Quadrant II for analysis. As a starting point, it must be determined how the requirement translates into human competencies—knowledge, skills, abilities, attitudes and other personal characteristics—that are needed to accomplish it. This is a crucial step (and one that is most often skipped today) because it specifies in precise terms what needs to be done in order to meet the human performance requirement. It forms the basis for determining learning objectives.

Taking our example above, the requirement to shoot a missile in 30 seconds might require "knowledge of console operations" skill in operating multifunction interfaces" and "the manual dexterity (ability) to operate a track ball." Once these competencies are established, it is then possible to consider a range of solutions that might address the requirement. Such options include: classroom instruction, e-learning, system design changes, job performance aids, electronic performance

support systems; manpower adjustments; on-the-job-training; integrated electronic technical manuals; simulations, stimulations, models or games; experience; job redesign/automation; and other learning tools. In the present example, several recommendations might be made, including an e-learning course to impart console knowledge, an embedded training system to provide practice in multifunction interfaces, and a selection test to choose operators that have manual dexterity (since this ability would be difficult to train).

At this point, a set of metrics is also developed, so that the success of the potential intervention can be assessed (see Appendix X for a more detailed description of the measurement process). These metrics span several levels of measurement, including measures to assess whether trainees acquire the necessary knowledge and skills; whether they can transfer newly learned skills back to the job; and whether the desired results (I.e., mission goals) are achieved. Metrics are useful to assess the effectiveness of the intervention as it is being developed and also to determine whether it actually solves the human performance problems as they affect mission accomplishment during unit deployment.

The recommendations (solution options) generated in Quadrant II are then passed to Quadrant III for development. A number of processes and organizations may exist to build interventions since they can be quite varied in character. As noted, interventions can include traditional classroom instruction, e-learning; job performance aids; electronic performance support systems; manpower adjustments; on-the-job-training; integrated electronic technical manuals; simulations, stimulations, models or games; experience; job redesign/automation; etc. At this point in the process, initial assessments are conducted to ensure the intervention is achieving the desired results. This "formative evaluation" process provides important feedback to developers as the intervention is being designed.

Quadrant IV represents the execution and evaluation of the intervention. Here again, several organizations can be involved in the execution of human performance interventions. In fact, consistent with the Navy Learning Model (see Appendix X) we adopted, a combination or blended solution might be optimal. For example, a particular human performance requirement might be more effectively met by combining a short (traditional) class, with an e-learning course and a job performance aid. This also allows an overarching integration and coordination function must control the execution process so that duplication is avoided, while leverage and efficiencies are realized. In addition, all interventions have in common the notion that the outcome of the intervention is measured rigorously so that it is possible to determine whether the original requirement was met.

***The Four Quadrant Model***

On the preceding pages, we presented an overview of the human performance process. On the next several pages, we will further define each step of this process represented by our four-quadrant model and elaborating on the functions that must be performed to create a performance enhancing system. We will then provide recommendations that stem from those functions applicable to each of the quadrants.

Using the 4-Quadrant model as a starting point, we established the major functions that must be performed by a performance enhancing system. This process proceeded as follows: For each quadrant we conducted a functional decomposition and identified the major functions that needed to be performed. Next, we applied a list of descriptors to further define the process in each quadrant. These included the functions that must be performed, major triggers that exist, the related output of those functions, associated metrics, existing controls and incentives, and the required roles and responsibilities associated with the process under that quadrant.

For purposes of clarity in this study, we define the functions of a quadrant as the actions that must be taken to perform designated tasks within the process. By describing the functions in this

way, we can establish the necessary behaviors that are required to accomplish this function. The factors that influence these functions are referred to as triggers and can originate internally or externally. A response to these triggers can reflect reactive strategic actions or be undertaken in a proactive way by providing an outlet for initiatives. The output is defined as the product of the function and is utilized by the other quadrants for input as both a trigger and as a key factor for subsequent functions. Metrics refers to the standards used to evaluate the validity of the output and provide a means for comparison and measurement. Metrics also provides a reference point for feedback and reevaluation. The existing organizational framework allows mechanisms that guide or control behaviors associated with the various functions. It can also provide incentives and opportunities that help the quadrant function more efficiently. Once the necessary behaviors are determined for each function, they are organized into groups of required roles and responsibilities. By understanding how each of these related elements function and interact within the 4-Quadrant model, we can begin to apply the process to human performance to develop a performance enhancing system.

**Quadrant I: Define Requirements**

The first step in the process, defined by quadrant one, is to define human performance requirements. This is accomplished by breaking down jobs and job tasks into specific behaviors and competencies. Once these have been established, they must be validated and prioritized for determining specific job performance standards. In addition, guidance for acceptable risk must be established by evaluating the performance standards and the associated margin of level of performance. As mentioned earlier, this is a different approach than previously used to determine training needs. By allowing the end-users to determine human performance requirements and incorporating them into both the first and last step in the process, we have "built in" a mechanism for continuous improvement based on direct feedback, changing operational needs, and advances in technology.

The table below displays the results of the functional decomposition process for Quadrant I: Defining Requirements.

| | |
|---|---|
| Functions | • Establish human performance requirements<br>• Develop job performance standards<br>• Conduct job task analyses |
| Triggers | • New systems<br>• Performance problems<br>• Tactics change<br>• Safety issue<br>• New technology |
| Output | • Job performance requirements (stated as tasks) |
| Metrics | • Acceptable mission accomplishments |
| Controls & Incentives | • Policies, processes<br>• Resources |
| Required Roles & Responsibilities | • Validation function<br>• Prioritization function<br>• Resource function<br>• Evaluation and |

## Quadrant II: Design Solutions

Once human performance requirements have been established, certified, and prioritized, a process is needed to translate these requirements into viable solutions. The crux of this process is analytical—that is, expert analysts and subject matter experts must analyze the requirements and determine how best to meet them. Importantly, this is the step in the process where the science of learning can be applied. While some of the expertise to conduct such analyses exists within DoN, many more skilled analysts will be needed throughout the Navy training establishment. They should be brought together, supported properly and augmented by the best talent the commercial sector has to offer. They will be key to developing the science of learning

approaches to improving human (Sailor) performance.

The table below displays the results of the functional decomposition process for Quadrant II.

| | |
|---|---|
| Functions | • Analyze performance problems<br>• Apply science of learning & human performance<br>• Diagnose performance problems<br>• Generate KSATs for task lists<br>• Provide learning objectives<br>• Develop alternate solutions (the "menu")<br>• Recommend solutions<br>• Develop performance measures/MOEs/MOPs<br>• Create human performance analysis procedures<br>• Maintain internal workforce |
| Triggers | • Quad I inputs (approved requirements)<br>• Quad III inputs/lessons |
| Output | • Job performance enhancement solutions<br>• Cost analyses for solutions |
| Metrics | • Job performance enhancement solutions<br>• Cost analyses for solutions |
| Controls & Incentives | • "9000" series (acquisition) instruction and procedures<br>• DoD 5000 instructions<br>• Human performance-related key performance parameters (KPPs) |
| Required Roles & Responsibilities | • Human performance analysis function<br>• Cost estimation function<br>• Measurement function |

## Human Performance Analysis Process (Old version up to Quadrant III Discussion)

For the Navy to gain competitive advantage in technical training and address its human performance problems, we must first develop a process by which the Navy can turn critical information into a shared knowledge and value base. We define a formal process for human performance as a cyclical model that defines human performance requirements, establishes how best to achieve this performance, develops the necessary tools or products, implements the solution, and provides feedback based on an evaluation of the outcome. By creating a process, our training system can function while continually learning, adapting, and rejuvenating itself. This leads to an improved organizational problem-solving ability and capacity for action. To fully exploit organizational knowledge, this process will build on collective knowledge and experience, based on organizational memory dependent on institutional mechanisms (e.g., policies, strategies, and explicit models) used to retain knowledge. It also allows our training system to continually transform itself to better manage knowledge, utilize technology, empower people, and expand learning to better adapt and succeed in the Navy's challenging environment.

We developed a Human Performance Analysis Process around a four quadrant model (see chart). The process begins in Quadrant I by generating human performance requirements. Requirements are expressed in terms of what human operators are expected to do, and not in the current practice of using terms of training that drive to a particular solution. For example, the current practice allows stating the requirements like, "provide a training course in C-school for missile operators." In this case, the requirement is stated in such a way as to preclude a human performance assessment, and drives directly to a specific solution (a training course). In contrast, our new concept allows requirements to be expressed in terms of what the human operator (or team) needs to do to accomplish the job or mission—for example,

"the operator must be able to shoot a missile within 30 seconds." Stated in this way, the requirement does not pre-determine a solution; rather, it states a human performance target that may be met in several ways. More importantly, it allows for an appropriate analysis to be conducted so that an optimal solution can be devised.

Quadrant II describes the solution building process. As human performance requirements are established, they move to Quadrant II for analysis. As a starting point, it must be determined how the requirement translates into human competencies—knowledge, skills, abilities, attitudes and other personal characteristics—that are needed to accomplish it. This is a crucial step (and one that is most often skipped today) because it specifies in precise terms what needs to be done in order to meet the human performance requirement. It forms the basis for determining learning objectives.

Taking our example above, the requirement to shoot a missile in 30 seconds might require "knowledge of console operations" skill in operating multifunction interfaces" and "the manual dexterity (ability) to operate a track ball." Once these competencies are established, it is then possible to consider a range of solutions that might address the requirement. Such options include classroom instruction, e-learning, system design changes, job performance aids, electronic performance support systems, manpower adjustments, On-the-Job Training (OJT); Integrated Electronic Technical Manuals (IETM), simulations, stimulations, models or games, experience, job redesign/automation, etc.. In the present example, several recommendations might be made, including an e-learning course to impart console knowledge, and embedded training system to provide practice in multifunction interfaces, an a selection test to select operators that have requisite manual dexterity (since this ability would be difficult to train).

At this point, a set of metrics is also developed, so that the success of the potential intervention can be assessed (see Appendix X for a more detailed description of the measurement process). These metrics span several levels of measurement, including measures to asses whether trainees acquire necessary knowledge and skill; whether they can transfer newly learned skills back to the job and whether the desired results (i.e., mission goals) are achieved. They are useful to assess the effectiveness of the intervention as it is being developed and also to determine whether it actually solves the human performance problem (in mission accomplishment terms) once deployed.

Recommendations (solution options) generated in Quadrant 2 are then passed to Quadrant 3 for development. A number of processes and organizations may exist to build interventions since they can be quite varied in character. As noted, interventions can include traditional classroom instruction; e-learning; job performance aids; electronic performance support systems; manpower adjustments; on-the-job training; integrated electronic technical manuals; simulations, stimulations, models or games; experience; job redesign/automation; etc. At this point in the process, initial assessments are conducted to insure the intervention is achieving desired results. This "formative evaluation" process provides important feedback to developers as the intervention is being designed.

Quadrant IV represents execution and evaluation of the intervention. Here again, several organizations can be involved in the execution of human performance interventions. In fact, consistent with the Navy Learning Model (see Appendix X) we adopted, a combination or blended solution might be optimal. For example, a particular human performance requirement might be best met through a combination of a short (traditional) class, coupled with an e-learning course and a job performance aid. Importantly, an overarching integration and coordination function must control the execution process so that duplication is avoided, while leverage and efficiencies are realized. In addition, all interventions have in common the notion that the outcome of the intervention is measured

rigorously so that it is possible to determine whether the original requirement was met.

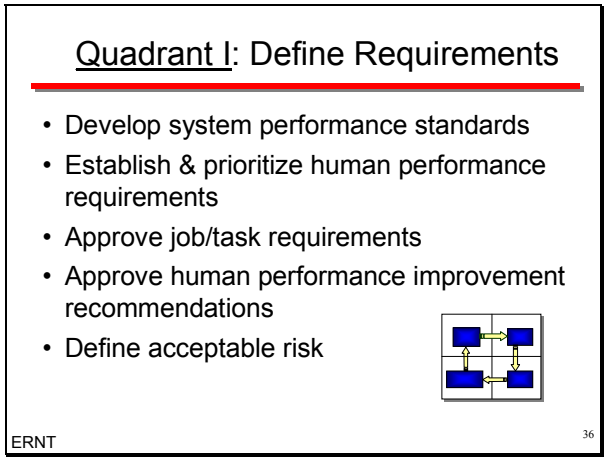
On the preceding pages, we presented an overview of the human performance process. On the next several pages, we will further define each step of this process represented by our four-quadrant model and elaborating on the functions that must be performed to create a performance enhancing system. We will then provide recommendations that stem from those functions applicable to each of the quadrants.

Using the 4-Quadrant model as a starting point, we established the major functions that must be performed by a performance enhancing system. This process proceeded as follows: For each quadrant we conducted a functional decomposition and identified the major functions that needed to be performed. Next, we applied a list of descriptors to further define the process in each quadrant. These included the functions that must be performed, major triggers that exist, the related output of those functions, associated metrics, existing controls and incentives, and the required roles and responsibilities associated with the process under that quadrant.

For purposes of clarity in this study, we define the functions of a quadrant as the actions that must be taken to perform designated tasks within the process. By describing the functions in this way, we can establish the necessary behaviors that are required to accomplish this function. The factors that influence these functions are referred to as triggers and can originate internally or externally. A response to these triggers can reflect reactive strategic actions or be undertaken in a proactive way by providing an outlet for initiatives. The output is defined as the product of the function and is utilized by the other quadrants for input as both a trigger and as a key factor for subsequent functions. Metrics refers to the standards used to evaluate the validity of the output and provide a means for comparison and measurement. Metrics also provides a reference point for feedback and reevaluation. The existing organizational framework allows mechanisms that guide or control behaviors associated with the various functions. It can also provide incentives and opportunities that help the quadrant function more efficiently. Once the necessary behaviors are determined for each function, they are organized into groups of required roles and responsibilities. By understanding how each of these related elements function and interact within the 4-Quadrant model, we can begin to apply the process to human performance to develop a performance enhancing system.

## Quadrant I: Define Requirements

In the preceding page, we gave an overview of the human performance process. In the next several pages, we will define each step of the process by elaborating further on the functions that must be performed and by providing recommendation(s) that stem from those functions



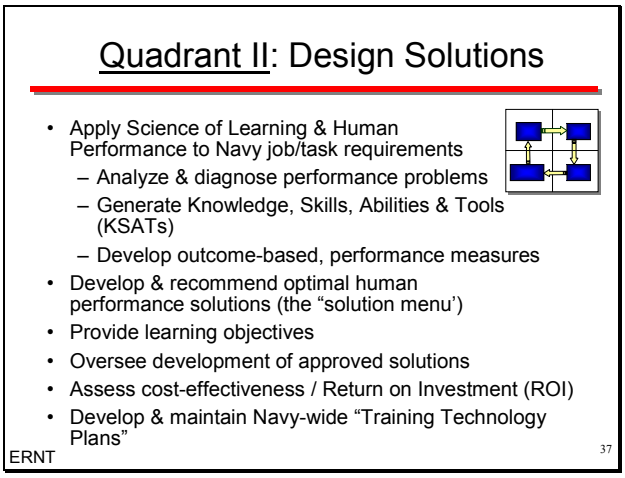

Using the four-quadrant model as a starting point, we conducted a functional decomposition to establish the major functions that must be performed by a viable performance enhancing system. This process proceeded as follows. For each quadrant, we identified the major functions that need to be performed. Next, we applied a list of descriptors (generated a priori) to further understand the process in each quadrant. These included the functions that must be performed, major triggers (initiating events or circumstances), output, metrics, controls and incentives, and required roles/responsibilities associated with the process under that quadrant.

The table below displays the results of the functional decomposition process for Quadrant I.

| | |
|---|---|
| Functions | • Establish human performance requirements<br>• Develop job performance standards<br>• Conduct job task analyses |
| Triggers | • New systems<br>• Performance problems<br>• Tactics change<br>• Safety issue<br>• New technology |
| Output | • Job performance requirements (stated as tasks) |
| Metrics | • Acceptable mission accomplishments |
| Controls & Incentives | • Policies, processes<br>• Resources |
| Required Roles & Responsibilities | • Validation function<br>• Prioritization function<br>• Resource function<br>• Evaluation and |

## Quadrant II: Design Solutions

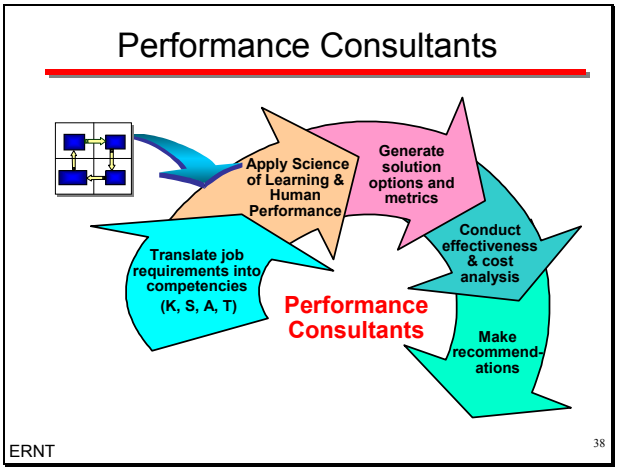
Once human performance requirements have been established, certified, and prioritized, a process is needed to translate these requirements into viable solutions. The crux of this process is analytical—that is, expert analysts and subject matter experts must analyze the requirements and determine how best to meet them. Importantly, this is the step in the process where the science of learning can be applied. While some of the expertise to conduct such analyses exists within DoN, many more skilled analysts will be needed throughout the Navy training establishment. They should be brought together, supported properly and augmented by the best talent the commercial sector has to offer. They will be key to developing the science of learning approaches to improving human (Sailor) performance.




The table below displays the results of the functional decomposition process for Quadrant II.

| | |
|---|---|
| Functions | • Analyze performance problems<br>• Apply science of learning & human performance<br>• Diagnose performance problems<br>• Generate KSATs for task lists<br>• Provide learning objectives<br>• Develop alternate solutions (the "menu")<br>• Recommend solutions<br>• Develop performance measures/MOEs/MOPs<br>• Create human performance analysis procedures<br>• Maintain internal workforce |
| Triggers | • Quad I inputs (approved requirements)<br>• Quad III inputs/lessons |
| Output | • Job performance enhancement solutions<br>• Cost analyses for solutions |
| Metrics | • Job performance enhancement solutions |

| | |
|---|---|
| | • Cost analyses for solutions |
| Controls & Incentives | • "9000" series (acquisition) instruction and procedures<br>• DoD 5000 instructions<br>• Human performance-related key performance parameters (KPPs) |
| Required Roles & Responsibilities | • Human performance analysis function<br>• Cost estimation function<br>• Measurement function |




## Performance Consultants

This figure displays the process associated with Quadrant II in more detail. As noted, this process depends on the skill, energy, and awareness of experts who can analyze human performance requirements to develop solutions. The first step in this process is to translate human performance requirements into competencies—that is, what the learner needs to have in order to accomplish the job or task. Traditionally, competencies have been expressed in terms of knowledge, skills and abilities (KSAs). Other models factor in attitudes and tools necessary to accomplish the job. Once competencies are established, the range of possible ways those competencies can be imparted must be considered. Importantly, the emphasis of this process shifts away from strictly traditional training solutions to include other interventions such as:

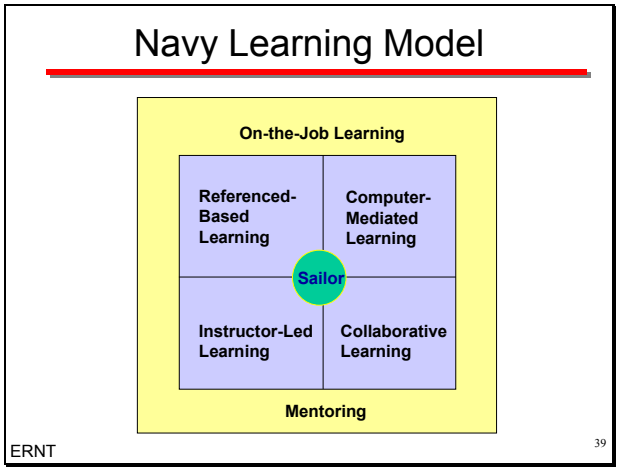
- Manpower adjustments
- Improvements in technical support
- Job performance aides
- System redesign
- Changes in operating or maintenance procedures
- Etc.

An important part of this process is the concept of performance consultants. There is a marked trend in industry to use performance consultants to assess and help solve human performance problems. Performance consulting is a disciplined approach to diagnosing individual and organizational performance issues and opportunities and recommending solutions. Those who are trained as performance consultants understand human performance and competencies, and also appreciate the range of potential solutions for imparting those competencies. Ideally, these experts have an educational background and experience in an applied human performance/behavioral science field.

In addition, it should be noted that performance consultants always work in close association with subject matter experts and end users when they are most effective. In fact, it is almost always the case that a team of performance consultants with complementary expertise will be deployed to analyze a performance situation.

## Navy Learning Model

As part of the Revolution in Training, we adopted a Navy Learning Model to provide a common framework for developing Navy training. The model describes several ways in which people learn (see figure to the right).




Why did we formulate this model, and why do we present it at this point in our report? We learned that many commercial enterprises have found it useful to characterize learning in this way. By arraying the learning techniques in this model, they have enabled corporate leaders and learners alike to understand the opportunities for teaching and learning afforded by melding the best of traditional approaches with the newest technologies. The four blocks in the center of this Navy learning model coincide with the portrayals of the IBM Corporation and others. We have added the surrounding learning level, on-the-job learning, to our model to reflect the enormous importance of hands-on, trail and error, mentor-guided learning in the performance of complex tasks by Sailors. Understanding this model of learning will help us explain how the set of human performance improvement solutions developed in quadrant II, and approved in quadrant I, should be built in quadrant III and fielded and applied in quadrant IV. Here is more detail on the five components of our Navy learning model:

*Reference-Based Learning*. This category describes situations where the learner gains access to information and knowledge as needed. It is characterized by a one-way interaction between the learner and the knowledge. In its most common form, it is reading and it may or may not be mediated by technology. In order to realize the potential of referenced-based learning, knowledge management (i.e., understanding when and where knowledge is required) and database design are central issues. In addition, getting the human-computer interface right is crucial when technology is involved. Examples of referenced-based learning material include: equipment/design manuals, CD-ROMs, tactical publications, internet databases, reference matter, videos, and books.

*Computer-mediated Learning*. In this category, the learner *interacts* with a computer, system, or other technology in order to learn. The system reacts to the learner by providing hints or cues, branching to new material, tailoring instruction, and/or providing feedback. Intelligent training technologies (e.g., automated performance assessment, diagnosis and feedback) are crucial to this type of training and will eventually, as technology develops, allow individual tutoring. Examples of computer-mediated learning include: computer-based training, intelligent tutoring, simulations, games, scenario-based training (one learner), training devices/simulators/stimulators and interactive electronic technical manuals (IETMs).

*Collaborative Learning*. Learning in this category occurs when learners teach and guide one another. Often, but not always, learners' interactions are computer-mediated because learners are physically dispersed. This type of training may or may not include a formal instructor or expert and often involves a scenario or exercise. Technologies necessary to provide and enable collaborative learning environments include those that allow distributed users to be networked together. Communication bandwidth is an important ingredient. Examples of this type of training include: chat rooms, multi-player games/simulations, peer-to-peer mentoring, computer-mediated mentoring, distributed team training, scenario-based training (multiple players), multi-platform exercises/team training and web-based study groups.

*Instructor-led Learning*. In this category, the learner interacts face-to-face with an instructor and other learners. This type of learning describes traditional, classroom-based learning as well as other techniques such as laboratories and role playing. Electronic classroom technologies can improve this type of

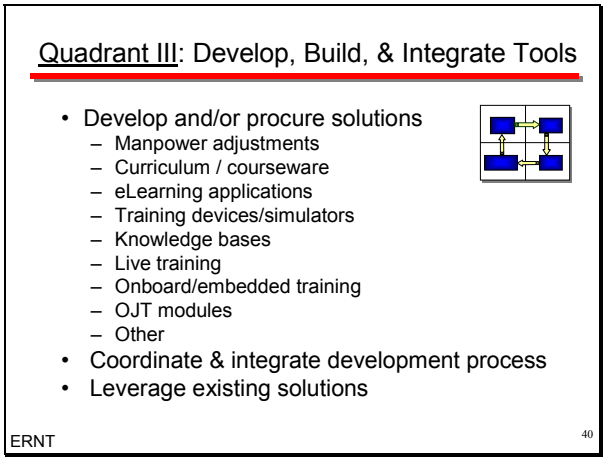
instruction, and instructors can lead dispersed students in "netted" classrooms. Other examples include: traditional classrooms, electronic classrooms, laboratories, role playing, and study groups.

*On-the-job Learning and Mentoring*. Learners in this category interact with their own equipment and/or situation as a mechanism for learning. This type of learning provides the basis for continuous learning environments, and requires an appropriate climate for learning. OJT can be individual or group-based. This category also includes specific mentoring by leaders on the job. Successful learning in this category benefits greatly from embedded training technologies, including automated instructor aids and automated assessment and feedback. It is also dependent on the ability of leaders to mentor their subordinates and of peers to mentor one another. Examples of this category include: embedded simulations/stimulations, mentoring & coaching, continuous learning, guided team self-correction, electronic performance support systems, and decision support systems. In interviews, Sailors told us that OJT was among the most valuable, relevant, and effective training from which they benefit.

## Quadrant III: Develop, Build & Integrate Tools

The adjacent chart and table below display the results of the functional decomposition process for Quadrant III—Build Interventions. This is perhaps the most vital, dynamic and _____ aspect of the 4-Quadrant Process. The approved solution could consist of any of a variety of measures to improve human performance, but the development of the specific training tools should be driven by the competitive marketplace.

| | |
|---|---|
| Functions | • Build solutions in accordance with Quad II recommendations<br>• Develop or procure curriculum/courseware<br>• Develop or procure e-learning materialsRefine learning objectivesDevelop or procure training devices/simulatorsDevelop or procure knowledge basesDevelop or procure live trainingDevelop or procure on-board training/ performance supportDevelop on-the-job training support materialsCoordinate/integrate development processesLeverage existing solutions (industry, Navy, academia)Apply metrics iteratively during development |
| Triggers | • Approved Quad II recommendations, with resources<br>• Approved Quad II recommendations, with resources |
| Output | • Human performance interventions for fielding<br>• Data to evaluate effectiveness of interventions |
| Metrics | • Formative evaluation measures |
| Controls & Incentives | • Effectiveness of intervention must be proven prior to implementation |
| Required Roles & Responsibilities | • Development function<br>• Measurement function |




We deliberately separated the process of developing these training tools from the development of the solution (quadrant II) to avoid any unintentional bias by "owners of the process." Quadrant II may in fact own some of the factors of production, e.g., those involved in developing solutions may own some curriculum development capability, but the development of the tools must be competed and won by the provider of the most cost-effective, timely solution.

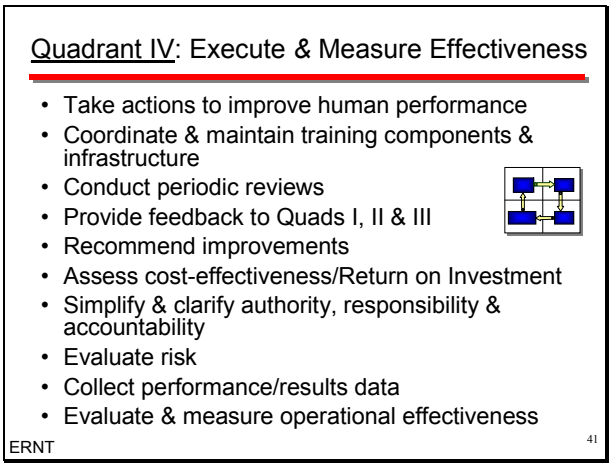
Separating these functions should help force the Navy's training establishment to become more vital and self-renewing. For example:

- If Quadrant II solutions call for more simulated training and less live training, programs supporting live training (e.g., flight hour program, steaming day funding, and classroom infrastructure) should be downsized accordingly.

- If one warfare community has already fielded a tool which meets an emergent need, then that tool would be leveraged resulting in a gradual merging of training solutions based on individual job performance requirements vice platform and/or community requirements.

## Quadrant IV: Execute & Measure Effectiveness

Quadrant IV is where both the execution and the evaluation of the intervention occurs. We first discuss execution functions, followed by evaluation functions




The table below displays the results of the functional decomposition process for Quadrant IV—Conduct Interventions

| | |
|---|---|
| Functions | •Conduct human performance enhancing intervention<br>• Integrate/coordinate training components<br>• Maintain/manage training infrastructure<br>• Conduct periodic review of executions<br>• Provide continuous human performance support to the Fleet (help desk)<br>• Develop/provide instructor training<br>• Track Fleet performance problems for action by Quad II |
| Triggers | •Quad III products ready for implementation• Quad II recommendations |
| Output | •Human performance intervention<br>• Data to support effectiveness of intervention |
| Metrics | • Readiness |
| Controls & Incentives | Evaluation of products by CINC |

| | |
|---|---|
| Required Roles & Responsibilities | • Development function<br>• Procurement function<br>• Evaluation function<br>• Integration/coordination function<br>• Infrastructure management function<br>• Training delivery function• Browser function (the "front office" of training) |

The table below displays the results of the functional decomposition process for Quadrant IV—Measure Effectiveness

| | |
|---|---|
| Functions | • Link implemented solution to job performance requirements<br>• Evaluate/measure effectiveness of intervention<br>• Conduct periodic reviews<br>• Collect performance/results data<br>• Diagnose problems with interventions<br>• Provide feedback to Quad I, II, & III<br>• Recommend improvements<br>• Assess cost effectiveness/Return on Investment<br>• Evaluate risk |
| Triggers | • Continuous<br>• Conduct of, or completion of, interventions |
| Output | •Evaluation data• Effectiveness reports |
| Metrics | • Readiness |
| Controls & Incentives | Independent assessment conducted by CINC |
| Required Roles & Responsibilities | •Evaluation function•Feedback function |

## Functional Analysis Recommendations

Develop an organizational construct to support the Human Performance Process.


The next step in devising the new process was to test the human performance model analytically by applying Use Cases. In particular, we were interested in assessing the ability of new organizational constructs and structures to cope with typical human performance problems in the Navy. These Use Cases described typical situations that would trigger a new organization to act and were employed to compare the way in which the situation would be handled by today's system with the way we envision it would be dealt with by a proposed system. In addition, application of the Use Cases uncovered a host of issues—from specification of decision authority, to funding flow, to policy changes—that we had not considered fully. As we discussed these issues in the context of the specific Use Case, we were able to generalize the conclusions and make necessary modifications to the proposed organizational entities and structure.

- This is the state of our potential recommendations, then, stemming from our work on applying the science of learning model.

- But we learned a great deal from applying the Use Cases to the model. We explored real Navy issues. We confirmed for ourselves that

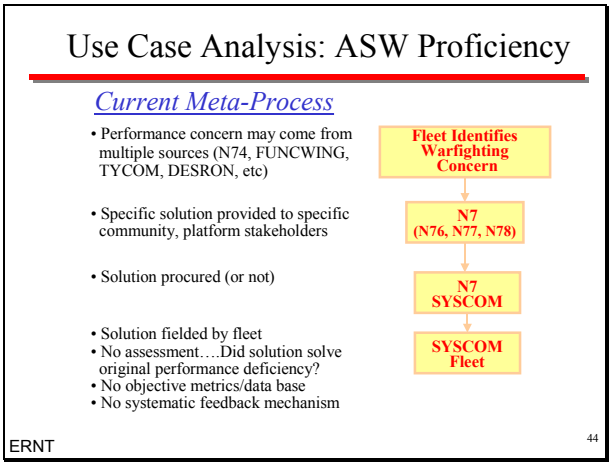
the recommendations above would yield a process that would embody those characteristics we set about to incorporate into Navy training and learning. You may remember them from our earliest brief: flexibility, learner centrality, adaptability, self-renewability, accountability, etc.

The Fleet, under the aegis of the Integrated Training Organization conducts the training as dictated by the CINC (Quadrant I) and funded by OPNAV. Organizational tension is sustained because the executor of the requirements is separate and distinct from the resourcer and the requirement setter. Additionally, because the ITO is responsible solely for IDTC training, those resources are not directly vulnerable for redistribution to either initial pipeline or operational deployment training. The ITO is responsible for overseeing IDTC training implementation for all communities, responsible for identifying shortfalls, etc

The Fleet N7 would first establish the job/task performance standards in Quadrant I, then approve the metrics from among those developed in Quadrant II, and finally, assess the performance as executed in Quadrant IV. This clearly places the focus at the Fleet CINC level – significantly expanding and increasing the roles and responsibilities of the Fleet N7.

## Use Case Analysis: ASW Proficiency

The next step in devising the new organization was to test it analytically by applying Use Cases. This is a well established and recognized methodology for evaluating expected organization performance, from a systems perspective, at an enterprise-wide level. In particular, we were interested in assessing the ability of the new organizational constructs and structure to cope with typical human performance problems in the Navy.




The Use Cases methodology could be applied to any issue facing the Navy, and those selected were topical of challenges the Navy training system was currently dealing with. typical situations that would trigger the new organization, and were used to compare how the situation would be handled by the current system to the proposed system. The use cases were conducted at the meta-level, and were particularly useful in identifying boundary issues and potential areas of conflict. In addition, application of the Use Cases uncovered a host of issues—from specifying of decision authority, to funding flow, to policy changes—that we had not considered fully. As we discussed these issues in the context of the specific Use Case, we were able to generalize the conclusions and make necessary modifications to the proposed organizational entities and structure.

We developed 10 specific use cases that would approach the four-quadrant model from different ways training requirements are determined.

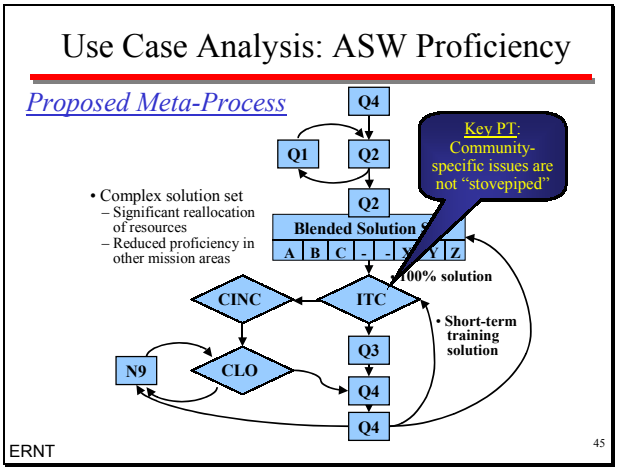
- New AT/FP Requirement
- Range Availability Lost
- CNO's Top 5 Issues
- F/A-18 Accident Rate Increases
- Virtual Reality - Tactical Training
- ASW Proficiency

- GMT
- Major Acquisition (DD-21)
- Career Development ("Learning Continuum")
- Inport Oil Spill

The 'ASW Proficiency' Use Case above and on the following page is a illustrative. In this particular scenario, an ASW proficiency concern is raised by the fleet in a particular community. That community's leadership decides that the solution is a new 3-day schoolhouse course (F-school) to be conducted by operators once during the IDTC. This requirement is passed to the appropriate OPNAV resource sponsor for approval and funding, and the course is developed and fielded at the local training activity (SUBTRACEN, FASO, etc) supporting the community that articulated the training problem.

From the human performance perspective, this process raises several issues. Assuming the original assessment was based on objective, Navy–wide performance standards and metrics, the presumption of a training deficiency versus a system, manpower, etc deficiency may have overlooked other, more cost effective solutions. Given a training solution, the decision of classroom, versus additional live, simulated, stimulated or distributed learning mediums may not have been considered. Finally, an evaluation of the total blended/optimum training solution, and the ability of the individual, team and/or unit to complete this requirement, vis-à-vis all other requirements, was probably not addressed.

The problem with the current approach starts at the requirements determination phase. The requirement is identified in terms of developing a course for a specific community not a performance deficiency that could impact the total force. Therefore the solution is dictated without an analysis of the problem or the development of metrics that could provide a systematic feedback.




This same job performance deficiency was then considered using the 4-Quadrant process. The results of this analysis, depicted to the right, capture the probable roles of each of the four quadrants (Q1, Q2, …) as the organization deals with this issue. In this case:

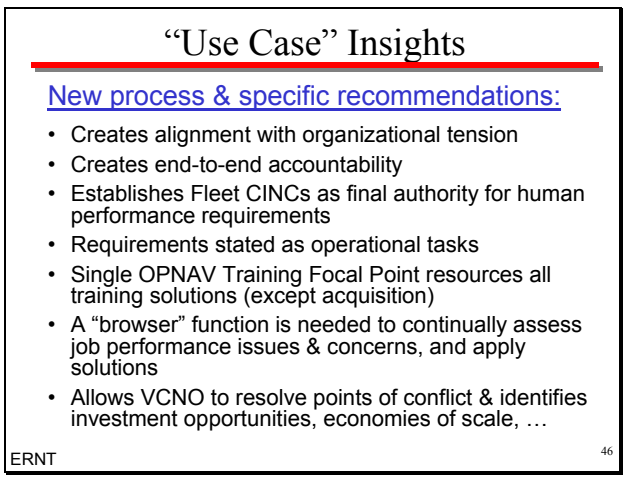
- The Fleet (Q4) assesses job performance against established performance metrics and identifies a community-wide performance deficiency.
- The performance concern revalidated by the CINC (Q1), and then analyzed by the HPSC (Q2).
- The HPSC identifies several different blended human performance solutions (A, B, C , …X, Y, Z) consisting of different training media, systems, manpower, etc. It's recommendation, as well as all of the other alternatives, are forwarded to the ITC for approval and implementation.
- After ITC concurrence, the training tools are built and fielded (Q3).
- The tools are employed and evaluated (Q4).
- In this sample, to meet ASW performance requirements the CINC is required to reduce performance in another mission area (e.g., the 'Core Competency' concept).

- Due to long-term impact and potential visibility of this decision, the CINC advises the Chief Learning Officer (CLO) who directs N9 to make the appropriate long-term resourcing decisions.

We gleamed several lessons from this Use Case. For example:

- The HPSC is not platform-centric, so existing solutions from other communities, fleets, industry can be leveraged.
- If the solution is not solely a training solution, then other advocates (I.e. SYSCOMs, CNP, etc) become involved.
- The CLO is required to resolve potential conflicts
- The fleet should make short-term decisions

The most important aspect of this process is that the requirement is stated in terms of a human performance deficiency that can be validated against a master task list. The HPSC then develops a the optimal solution to the stated requirement that could across communities. If the is a training solution requirement then a course and metrics are developed. The Training Command and the CINC will assess the course against the metrics and provide feedback to the appropriate command. Full accountability is maintained. Economies of scale are achieved. New innovations are easily inserted.




## "Use Case" Insights

We learned a great deal from applying the Use Cases to the model. We explored real Navy issues. We confirmed for ourselves that the recommendations above would yield a process that would embody those characteristics we set about to incorporate into Navy training and learning. You may remember them from our earliest brief: flexibility, learner centrality, adaptability, self-renewability, accountability, etc.

This use case provide some of the following insights:

- That requirements need to be stated in terms of human performance if it is to cross communities.
- Master task lists must be developed for all ratings.
- The there is a requirement for a integrated training command that can deliver training a across the fleet in the most efficiency and effective manner.
- That a new OPNAV organization is needed to work with the chief learning officer to provide the necessary allocation of resources.
- That a short term training solution could be implemented by the integrated training command.
- If there is an requirement for resources then the request must be provide to the Chief Learning Officer via the CINC.
- The VCNO is to resolve points of conflict.