

“Revolution in Training”



Executive Review of Navy Training

August 8, 2001

ERNT

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; incorporating new technologies into Navy training and exploiting opportunities available from the private sector; and developing a continuum of lifelong learning and personal and professional development for Sailors.

As we reviewed the state of Navy training today, we made some important discoveries. 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 should 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 turnover.

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 retirement as well. In the body of the report, we explain each of these recommendations and the reasons behind it. We believe it may be time to extend some educational and training benefits to family members.

In addition, we believe that an Implementation Team must form quickly and that substantial early actions are important to demonstrate the 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

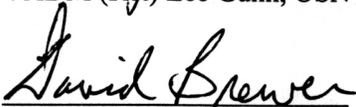
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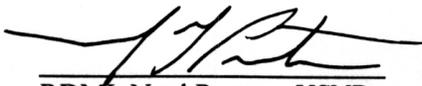
Executive Review of Navy Training

Final Report

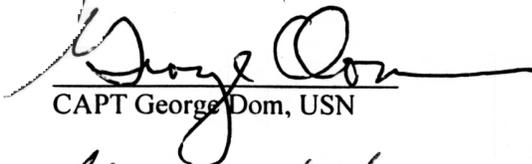
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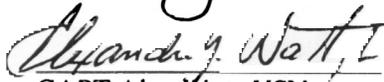

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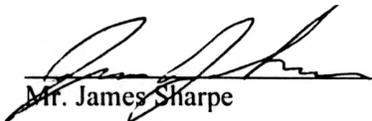

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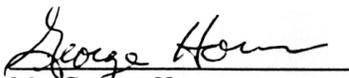

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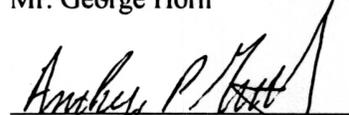

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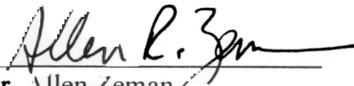

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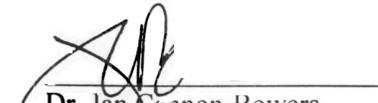

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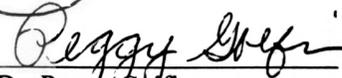

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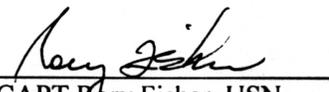

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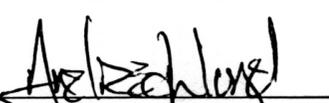

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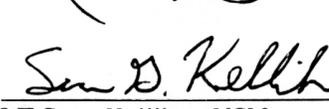

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Table of Contents

I. Introduction	1
Charter	1
Scope	1
Structure of Report	2
II. Why the Navy Needs a Training Revolution	5
To Provide Fully Trained and Proficient Naval Forces	5
Readiness & Increasing Training Requirements	6
Training Counts in Combat	7
Efficiency and Cost-Effectiveness are Important	8
Two Specific Example	8
Organization and Funding	10
Acquisition Process	11
War for People	12
Summary of Issues	16
III. What We've Learned	19
What We've Learned From History	19
Sailor Interviews	20
Islands of Excellence	21
From Industry and Academia	23
Human Performance	23
Science of Learning	25
Measurement in Training	26
Organizational Learning and Change in Industry	27
The War for Talent	28
Recruiting & Retaining People	29
Recruiting	29
Retention	29
About Technology, Learning, and Change	31
About the Navy	32
Principal Tenets	35
IV. ERNT Recommendations	37
Recommendation #1: Adopt a Navy Human Performance System Model	38
Quadrant I: Define Requirements	38
Quadrant II: Design Solutions	39
Quadrant III: Develop, Build, and Integrate Tools	40
Quadrant IV: Execute and Measure Effectiveness	40
Conclusions About the HPSM	41
The Navy Learning Model	42
CINC Roles & Responsibilities	44
A Human Performance Systems Organization (HPSO)	45
Recommendation #2: Align Training	47

Establish an Integrated Training Organization -----	47
Realign OPNAV Training Responsibilities -----	49
Establish a Transformation Command -----	51
Recommendation #3: Emphasize Human Performance in Acquisition -----	52
Recommendation #4 Establish a Lifelong Learning Continuum -----	54
Overarching Principles -----	54
Covenant Leadership-----	55
Demonstrated Commitment to Learning -----	55
Navy Learning Strategy -----	56
Empowered Individual Learner -----	56
Career Progression-----	57
Sailorization (Recruiting, DEP, & Boot Camp) Phase -----	57
Apprentice Phase -----	58
Journeyman Phase -----	59
Master Phases -----	59
Post-Navy Career Phase -----	60
V. Leading Change and Implementation -----	61
The Essential Components -----	61
The Fundamental Shifts -----	62
Changes to Navy Culture -----	63
Leading Change -----	64
Early (Almost Immediate) Steps -----	65
Communications -----	67
Set Stretch Goals-----	67
VI. Summary and Implications -----	69
Recap of Recommendations -----	69
Issues for Further Study -----	70
VII. Epilogue -----	73
Appendix A. Glossary of Terms -----	A-1
Appendix B. Acronyms and Abbreviations -----	B-1
Appendix C. References and Resources -----	C-1
Appendix D. ERNT Member Biographies and Executive Oversight Board-----	D-1
Appendix E. ERNT Industry & Military Site Visits Lessons Learned -----	E-1
Appendix F. Description of Human Performance System Model-----	F-1

List of Figures

Figure 1. Executive Review of Navy Training charter	1
Figure 2. Structure of the report.....	2
Figure 3. Why the Navy needs a training revolution	5
Figure 4. Defense strategy initiatives and studies support a revolution.....	6
Figure 5. Increase in aviation squadron IDTC training requirements from 1990 to 1998.....	6
Figure 6. Readiness vs. strike performance during operation Desert Fox	7
Figure 7. The funding gap in the Enlisted student billet account.....	8
Figure 8. Planned vs. actual C4ISR/IT installations on carrier battle groups	9
Figure 9. Flow of training funds from resource sponsor to major claimant for FY01	10
Figure 10. The current Navy training organization.....	10
Figure 11. Increases in crew size after initial platform delivery	11
Figure 12. Characteristics and consequences of the current acquisition process.....	11
Figure 13. Navy Training Systems Plans and the Acquisition Process	12
Figure 14. Actual and projected length of service distributions for the Enlisted force.....	13
Figure 15. Job mobility and short duration of non-college-bound high school graduates.....	14
Figure 16. Supply and demand challenges in the Navy’s “War for People”	15
Figure 17. Historical and projected Personnel Quality Index levels from 1979 to 2009	16
Figure 18. Projected PQI caused reduction in readiness for 2010	16
Figure 19. Human output analysis	17
Figure 20. Lessons learned from previous reorganizations	19
Figure 21. What we learned from Sailors	20
Figure 22. Examples of effective Navy training programs	21
Figure 23. The logic of work psychology	24
Figure 24. Learning technology potential	25
Figure 25. Tenets of the science of learning	25
Figure 26. Four levels of assessment	26

Figure 27. Characteristics of organizational learning and change	28
Figure 28. Lessons learned from industry.....	28
Figure 29. Reenlistment rates of Sailors who participate in VolEd.....	30
Figure 30. Generation Y	31
Figure 31. Things in HR to be Studied	35
Figure 32. Principal tenets	35
Figure 33. Characteristics of a Navy learning organization.....	36
Figure 34. A Human Performance System Model.....	38
Figure 35. Role of performance consultants	39
Figure 36. Navy Learning Model.....	42
Figure 37. CINC roles and responsibilities.....	44
Figure 38. Human Performance System Organization	46
Figure 39. N9 roles and responsibilities.....	51
Figure 40. Transformation Command.....	52
Figure 41. Changes to acquisition that emphasize human performance	52
Figure 42. Pillars of a Lifelong Learning Continuum.....	54
Figure 43. Sailorization phase.....	57
Figure 44. Apprentice phase	58
Figure 45. Journeyman and Master phases	59
Figure 46. Post-Navy career phase	60
Figure 47. Essential components of the human performance system	61
Figure 48. Fundamental shifts in basic assumptions.....	62
Figure 49. Changes to Navy culture.....	63
Figure 50. Leading change.....	64
Figure 51. Early implementation steps	66
Figure 52. Stretch goals	68
Figure 53. ERNT strategy roadmap	68

**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 that 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. Third, 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 also to address the optimum alignment of training resources.

The ERNT charter was specific (figure 1). 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,

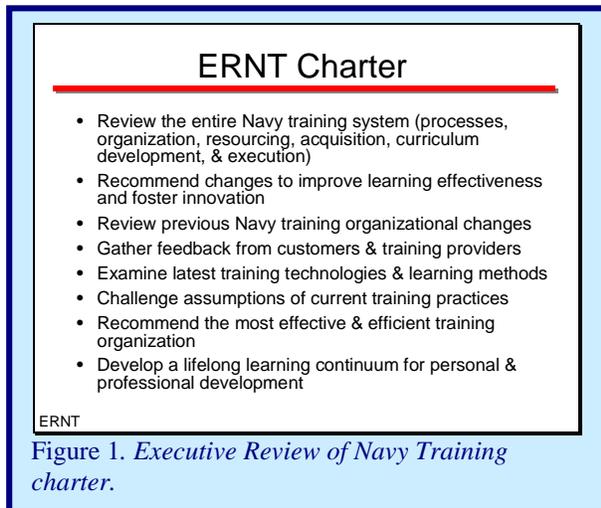


Figure 1. *Executive Review of Navy Training charter.*

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, their 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 the Navy

bases its 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 ERNT team was structured to address these issues. 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. Appendix D contains additional information on the 24 ERNT Working Group members.

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. A myriad of Navy places, big and small, deliver training

and education—providing over 900,000 learning opportunities to the 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, submarines, and aviation 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 apply as well to the civilian members of the Department of the Navy team.

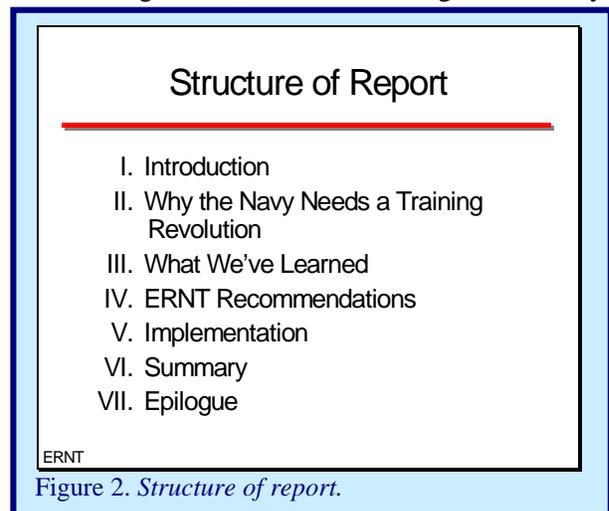
Structure of Report

This report comprises seven sections (see figure 2). Following this introduction, section two summarizes why the Navy must embark on the journey that is the Revolution in Training. 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.

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.



Following our summary, we end 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.

Visualize....

Open your mind and prepare to imagine the Navy of tomorrow: a Navy that values individual Sailors and learning; a Navy that nurtures lifelong 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 report provides you the beginnings of the blueprint for that Navy.



II. 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 the readiness of deployed Navy forces—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 position in which there is no choice but to recast its attitudes about training and about individual and team learning and human performance.

There are several reasons why the Navy needs a Revolution in Training (see figure 3). A revolution is necessary for the Navy to continue to provide fully trained and proficient naval forces, particularly in light of increasing training requirements and constrained training resources.

Why the Navy Needs a Training Revolution

- To provide fully trained and proficient naval forces
- To be more efficient and cost effective
- To emphasize the human component in acquisition
- To ensure the personal and professional success of our sailors

ERNT

Figure 3. *Reasons why the Navy needs a training revolution.*

The Navy’s training system must become more efficient and cost effective. The Navy can no longer afford duplicative work in isolated organizations if it is to meet its training and education requirements and readiness goals. The acquisition process must change the way in which it considers the human component of platforms and weapons systems. Creative human systems design can significantly reduce the amount of training Sailors need to operate and maintain systems. A revolution is also required to help the Navy win the “War for People” by enabling the personal and professional success of Sailors. This will involve a change 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.

In actuality, the Revolution in training is already under way in portions of the Navy and across industry. It will proceed, with or without a Navy plan. However, to achieve the greatest benefits for Sailors and the Fleet, the Navy must take the initiative and structure the Revolution to meet its most pressing needs.

To Provide Fully Trained and Proficient Naval Forces

Numerous military and government studies in recent years have demanded an overhaul of Cold War strategy and processes (figure 4). 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?

Training has an obvious and, to put it simply, 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 combat preparedness. 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 tasks 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. Facilities and funding, training manpower, and time to train are all essential to providing trained and proficient Navy people to the Fleet. Training to the right standards, as quickly as possible, and by the most effective means available are also essential to getting the most effectiveness for the least cost.

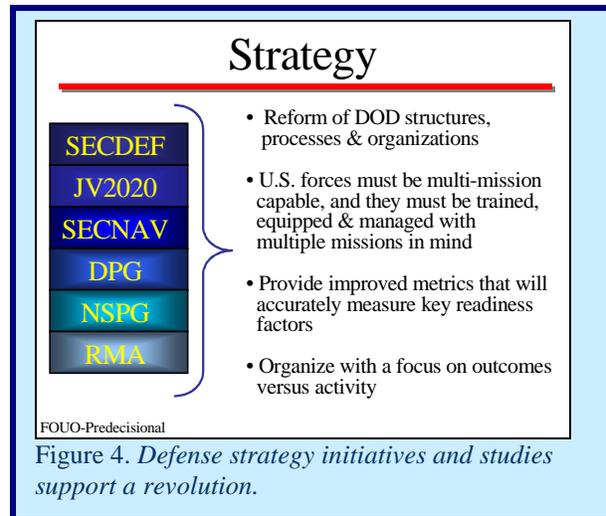


Figure 4. Defense strategy initiatives and studies support a revolution.

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 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 job Classifications (NECs), 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 community. 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.

Training requirements are increasing for the



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

individual Sailors as well. For example, there are four NECs for the Information Technologist (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. Although the shortfall in IT expertise affects nearly every mission area, 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 Command, Control, Communications, Computers and Intelligence (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 unit and Battle Group (and Amphibious Ready Group) training in the undermanned Fleet is conducted toward the end of the IDTC.

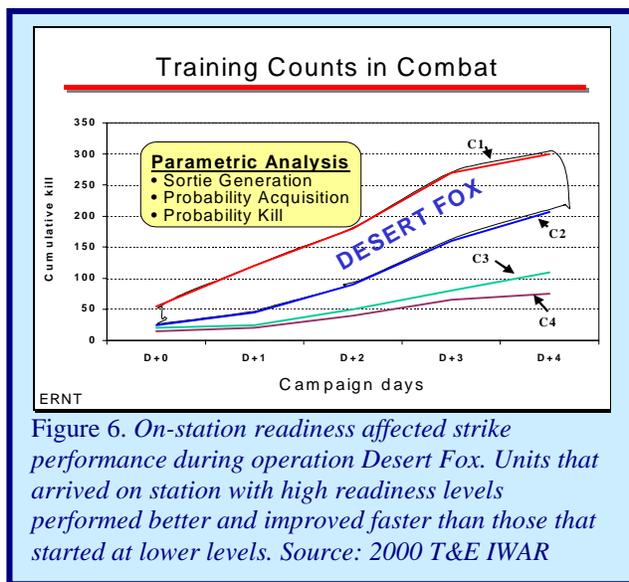
Although units of the Battle Group, and the Battle Group as a whole, achieve acceptable levels of readiness by the time they deploy, little in the way of training support goes along. In many mission areas, skills are hard to sustain. Much of the proficiency that individuals and teams achieve by the end of the IDTC atrophies during deployment.

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

In fact, the operational performance of units is extremely sensitive to their 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. The lessons are evident 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. Every unit, regardless of its readiness level when operations began, learned and became more proficient in the fight. However, units with higher initial readiness levels 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, although they learn in the fight, they do not “catch up” in the fight.

Ultimately, Navy training should be evaluated on its ability to meet human performance 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. In the next section we examine whether this is possible within today’s training system and environment.



Efficiency and Cost-Effectiveness Are Important

The Navy does not provide the very best possible training to its Sailors. Nor does it apply a modern skills-based approach to assessing Navy jobs to determine the competencies Sailors need to perform well in those jobs. The Navy's training organization is fragmented, and there are conflicting priorities in training funding. This results in duplication of training (both development and execution) and very little cross utilization of resources among communities. In this section, we examine some of these inefficiencies and how they relate to some current problems the Navy's training system faces.

Two Specific Examples

There are two problems in particular that illustrate the consequences of an inefficient training system. One is the imbalance between today's demand for classroom training and the funding for the billets that students occupy. The other is 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 that equipment.

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 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 that technology also makes possible. We should note here that we believe that training technologies are not an end in and of themselves. They are exciting tools, but they should be used only when they are the best choice for contributing to the improvement of human performance.

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 they dominate 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. We will show later that training requirements are increasing. As a result, Navy leaders and resource sponsors are being asked to fund large numbers of student billets year after year. (Student billets are the category in the Navy manpower account that represents the average number of students resident in schools throughout the year).

Student billets are paid for in military pay and allowances and are expensive. 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. The data show that if the demand for school seats meets the forecast, there will be between 7,634 and

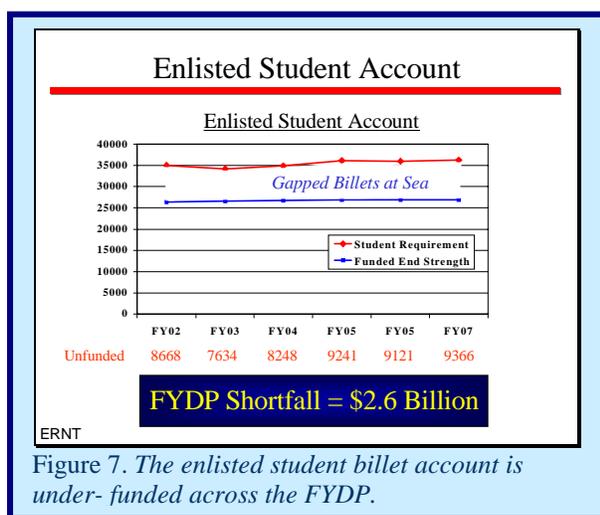


Figure 7. The enlisted student billet account is under-funded across the FYDP.

9,366 more students 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.)

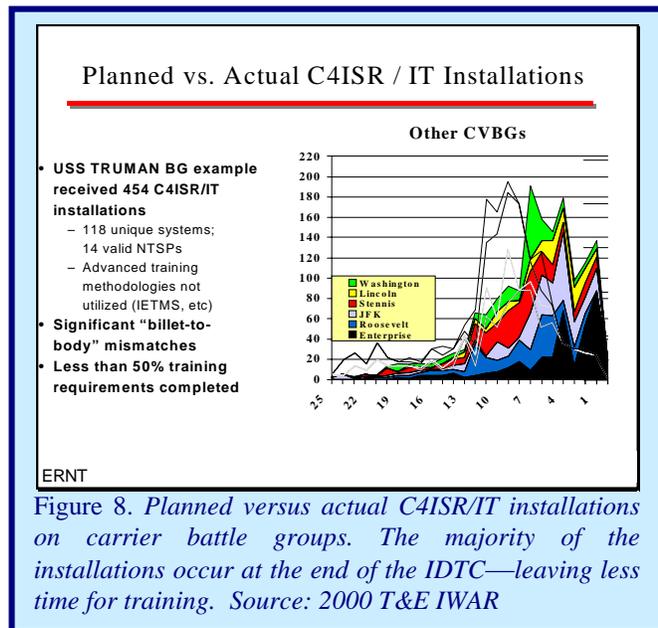
But overall Navy strength for these next six fiscal years is approximately in balance. That is, the total number of billets the Navy has chosen to fund in those years (sea and shore) is approximately the same as the total personnel strength the Navy is striving for. So, failure to pay for the thousands 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 temporarily vacant elsewhere. There are as many as 10,000 vacant Enlisted billets in the Fleet and in shore stations now. Many of these 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. In other words, the training budget may be about right for the Navy's current training needs, but inefficiencies must be eliminated so that the Navy can meet its manpower needs. 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 also other areas in which training changes could contribute to better efficiency. 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 CVBGs during the 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 their 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. Each of 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 require improving afloat manning, some added discipline in the installation process, and more support for crew training and job performance.

Whether the first two areas are improved soon or not, 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 they continue to learn on the job. We will resume 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.



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 13 claimants) is fundamentally flawed. Third, the Navy's acquisition process fails to value human systems integration and the contribution of people to systems' performance.

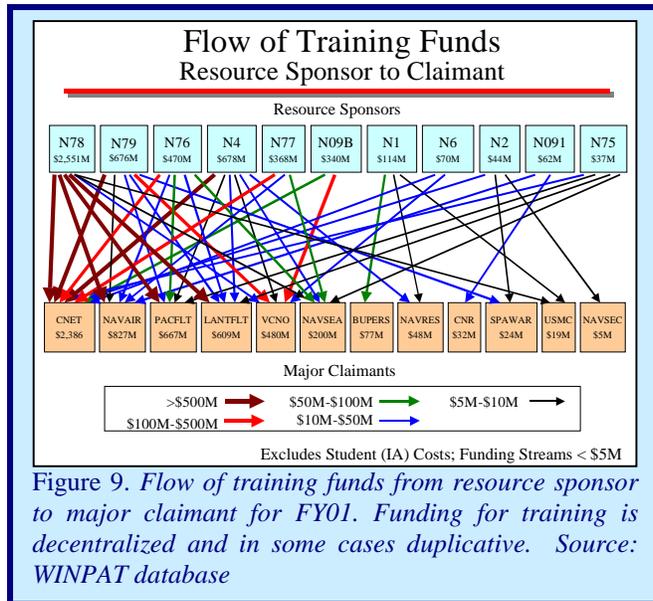


Figure 9. Flow of training funds from resource sponsor to major claimant for FY01. Funding for training is decentralized and in some cases duplicative. Source: WINPAT database

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, the 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.

As we said at the beginning of this section, 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. 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 chaos is that CINCLANTFLT and

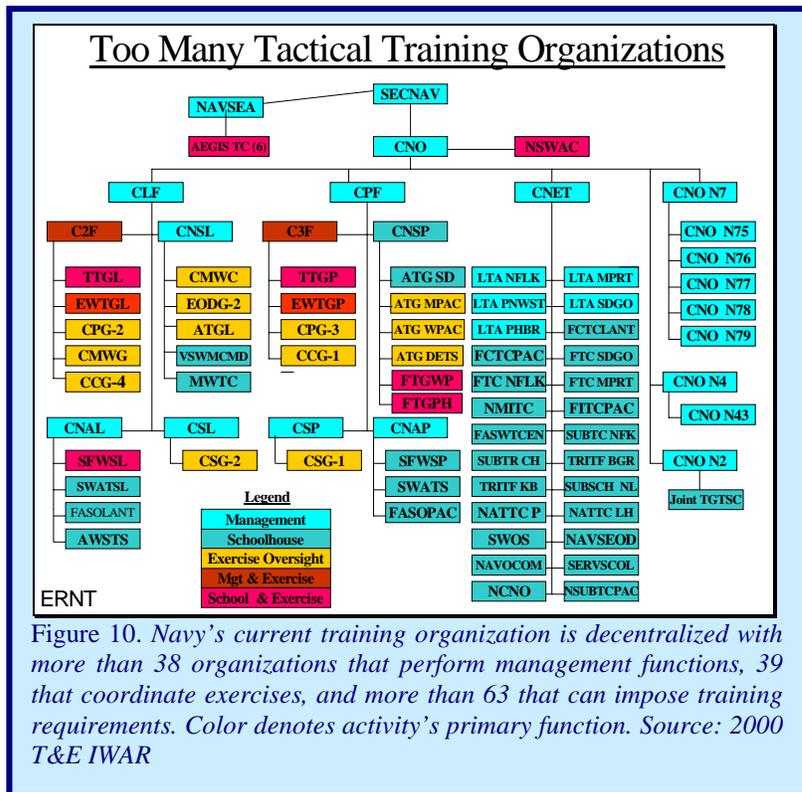


Figure 10. Navy's current training organization is decentralized with more than 38 organizations that perform management functions, 39 that coordinate exercises, and more than 63 that can impose training requirements. Color denotes activity's primary function. Source: 2000 T&E IWAR

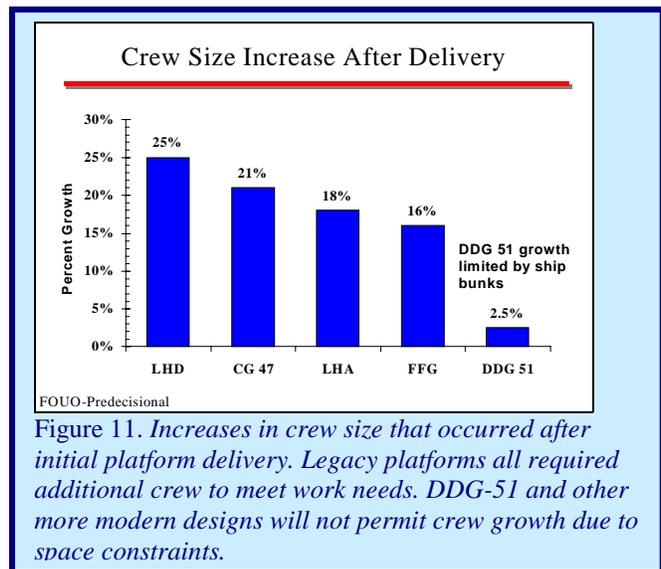
CINCPACFLT training requirements frequently differ for the same platform and missions. It is this fragmented structure that today is responsible for the training, learning, and development of our 375,000 Active Component (AC) Sailors and our 88,000 Reserve Component (RC) Sailors.

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, the human interface must be considered as part of the system. If it is not, 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 an integral component of 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.

It is generally true that 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.) to be 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 system's 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 following delivery of the ships illustrate the point. Some growth is attributable 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 logistics support elements are not traded away during acquisition. Figure 12 describes again the

Acquisition Process

Today's acquisition process:

- Primary goal is on the development, delivery, and completion of the Operation & Technical Evaluation for each weapon system
- Focus during the initial design phases is on hardware and software challenges, not on the “Human” component
- Cost tradeoffs inevitably favor system delivery problems
 - Funding cutbacks usually result in the transfer of programmed training funds to fix delivery problems

Consequences:

- Lack of human design focus results in
 - More complex and ineffective training
 - Increased manning
- Lack of life-cycle support results in
 - Out of date curricula
 - Out of configuration TTE and training devices in training commands

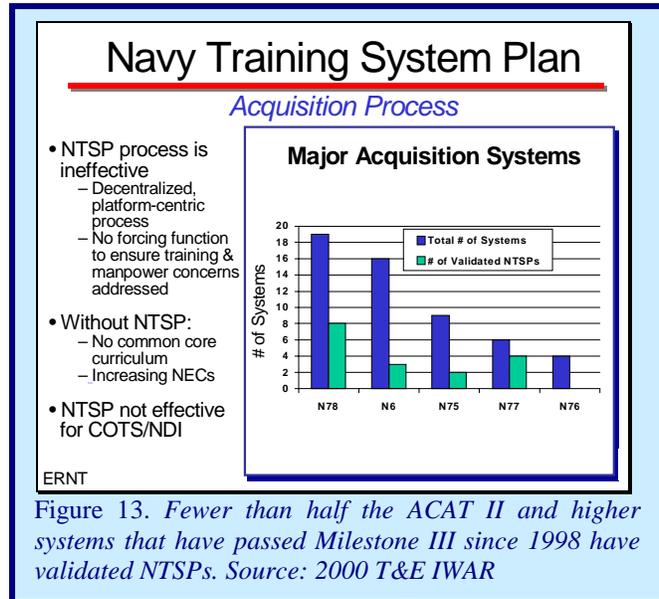
ERNT

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

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, training agent, and personnel command to review and assess training plans.

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. If the NTSP is stalled, the result may be deficient manpower, personnel, and training support. Unfortunately, in today's Navy, not all acquisition systems have validated NTSPs. Figure 13 shows the number of Acquisition Category (ACAT) I and II 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 Navy directives 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.

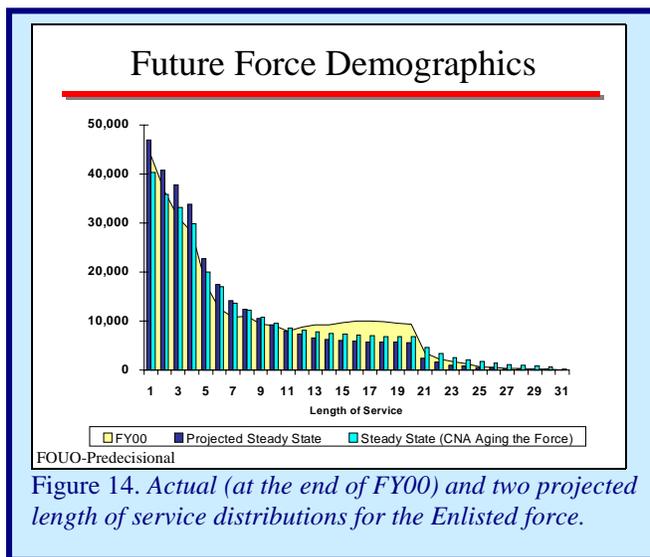
The introduction and use of Commercial Off-the-Shelf (COTS) and Non-Developmental Items (NDI) aggravates the problem. The time to develop and deliver weapon systems (and the associated training and ILS support) is becoming shorter. On the one hand, this is a useful assault on the perennial problem of 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

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 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. Leaders are obligated to meet these expectations.

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 black line (over the yellow area) 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 an (temporary) abundance of experience. That abundance is represented by the black line 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.



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 to rely increasingly on recruiting and training the right kinds of young people. This is already becoming more difficult:

- The average cost of a Navy recruit 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 50th 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 enhanced job satisfaction. Today, the Navy does not use a process for matching people to occupations that considers individuals' interests or desires. 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 or timing of accessions. 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 text box on the next page). Perhaps not surprisingly, first-term attrition hovers around 40 percent and increased by more than 21 percent between FY91 and FY96 (the latest attrition cohort that can be tracked through its entire first enlistment). In

concrete terms, the average recruiter is able to recruit just about one new recruit each month, and almost half of the recruiting effort is spent refilling holes created by recruits and Sailors who fail to complete their initial enlistments.

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 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 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.

The Navy's job classification process is rigid and perfunctory. New recruits are assigned to training and career tracks that are based largely on assessments 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

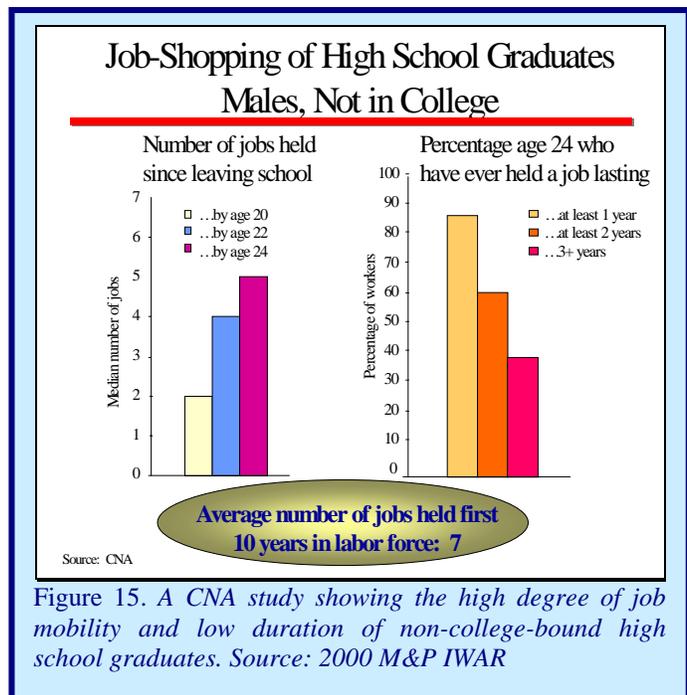


Figure 15. A CNA study showing the high degree of job mobility and low duration of non-college-bound high school graduates. Source: 2000 M&P IWAR

jobs and careers often. As the set of bars on the left side of figure 15 shows, the typical member of this group will hold six 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, again often without regard for their individual needs or desires. 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 the DD-21, are being designed to operate with smaller but more broadly trained and educated crews.
 - Sailors already receive increasingly extensive training, as captured by NEC requirements. For example, E-5 Sailors in an Arleigh Burke DDG-51 class ship require, on average, 39 percent more technical training than a similar cohort in the older, Spruance DD-963 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 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.

It is increasingly important that the Navy attracts and retains high-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 measures 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

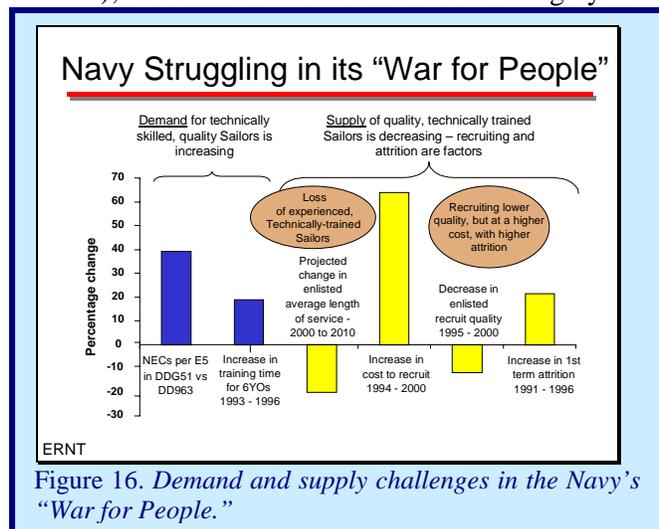


Figure 16. Demand and supply challenges in the Navy’s “War for People.”

- Proportion of personnel with high school diplomas
- Average experience levels
- Disciplinary actions.

CNA developed a measure, called the Personnel Quality Index (PQI), that 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 from 1979 to 2000, and the predicted value from 2001 to 2010.

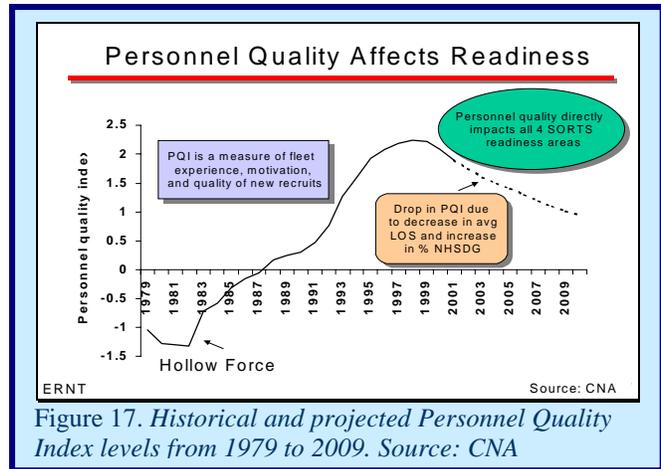


Figure 17. Historical and projected Personnel Quality Index levels from 1979 to 2009. Source: CNA

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:

- The average length of service in the force will be lower as Sailors who enlisted in the 1980s reach retirement eligibility.
- The Navy has been forced to respond to the competitive recruiting market by allowing the proportion of non-high school diploma recruits to increase from 5 to 10 percent.

The impact of the projected decline in PQI is 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 1998 and 2010.

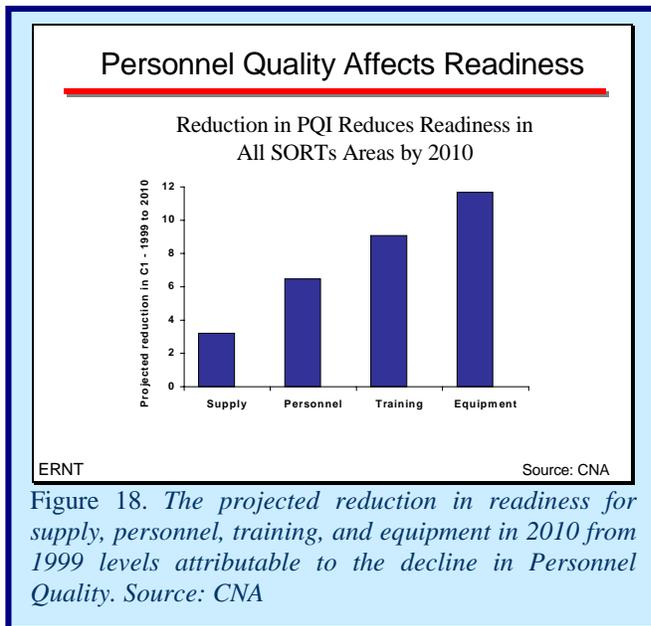


Figure 18. The projected reduction in readiness for supply, personnel, training, and equipment in 2010 from 1999 levels attributable to the decline in Personnel Quality. Source: CNA

Given the projected difficulties in 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.

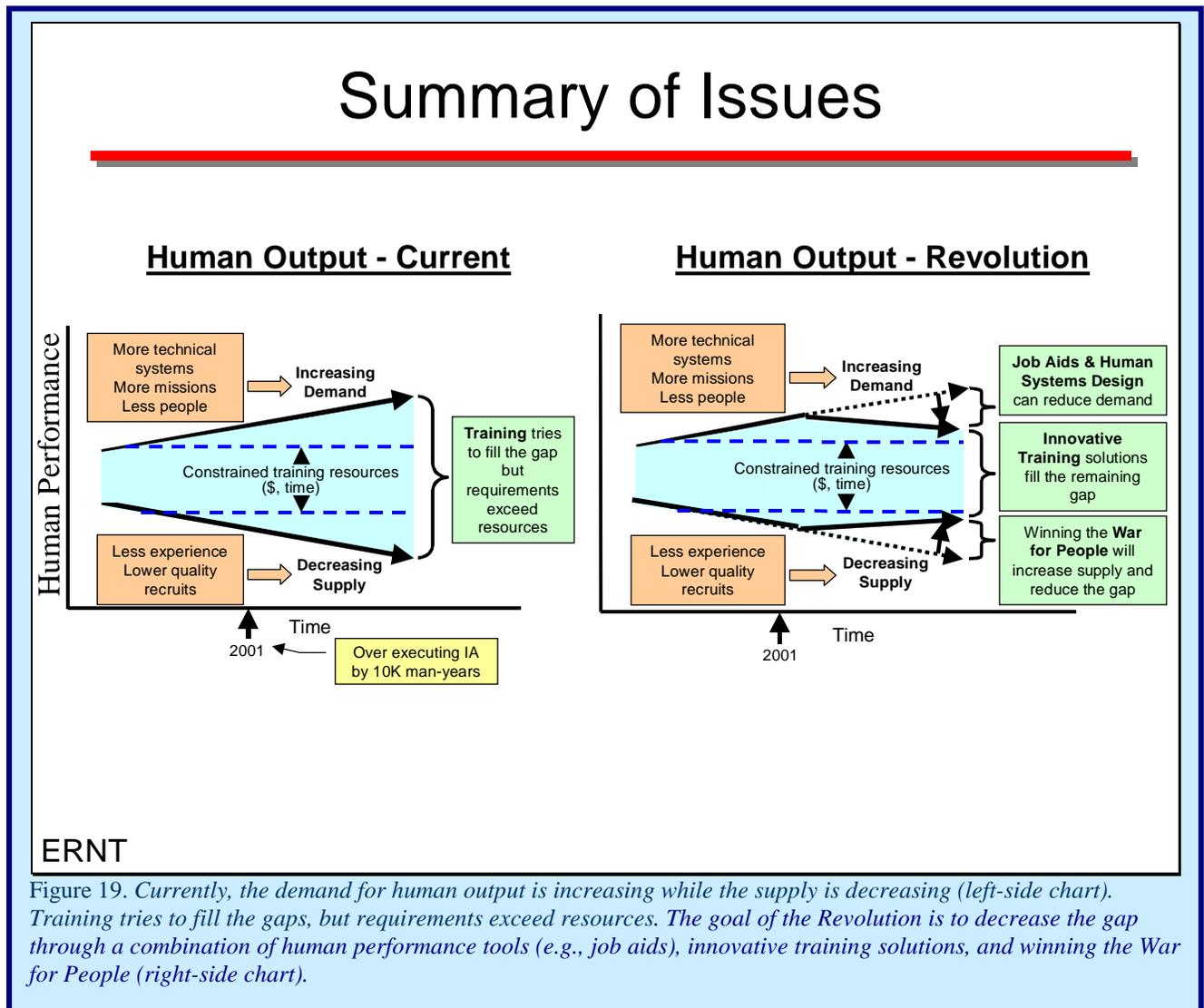
Summary of Issues

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 be closed only by:

- Improving the design of systems Sailors operate and maintain, 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.

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. The second graph on figure 19 illustrates closing the gap.



Total Force/Reserve Component Issues

The Naval Reserve force of today is inextricably intertwined with the Active Component that it supports. The Naval Reserve represents 20 percent 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 also apply to the Reserve Component. 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. 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. More importantly, the AC determines training requirements for the RC by specifying the type of support desired from the RC.

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, in addition to fulfilling their Navy responsibilities. The typical SELRES continually performs a juggling act—balancing time requirements of the Naval Reserve and the 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 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, they will be at least as important to the Reserve Component.

III. 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 and approaches that have worked there in meeting many of the same challenges the Navy now faces—a tight labor market and rapidly changing technology. (See Appendix E for industry visits.)

What We've Learned From History

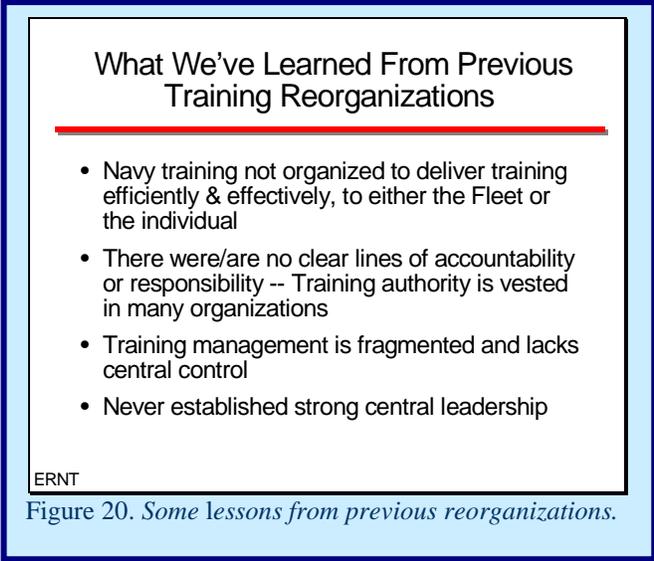
The Navy has reorganized its training establishment five times since 1971. It has also conducted numerous studies of its training organizations and functions during the same period. A common thread in all of the reorganizations and studies was that Navy training, management, and organizations could be 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 that but fell short.

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. Figure 20 reiterates some of the lessons from previous attempts at reorganization.

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

- Did not advocate a “systems approach”
- Focused solely on schoolhouse training, thereby ignoring Fleet training and the opportunities for eLearning, simulation, etc.
- Never established strong central training leadership and/or management
- Focused on organization, not processes or 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.



What We've Learned From Previous Training Reorganizations

- Navy training not organized to deliver training efficiently & effectively, to either the Fleet or the individual
- There were/are no clear lines of accountability or responsibility -- Training authority is vested in many organizations
- Training management is fragmented and lacks central control
- Never established strong central leadership

ERNT

Figure 20. *Some lessons from previous reorganizations.*

We agree with the principal findings of these studies. A catalyst of 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 yield statistically significant results; 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 21 lists some of the themes from the interviews.

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.

From Today's Sailors – Low Expectations

We say that Training is important, but...

- We don't provide adequate time to train
- Training facilities, resources, & equipment are inadequate
- We don't explicitly encourage growth & development
- We don't publicize learning opportunities well

Significant “Message Mismatches”

ERNT

Figure 21. *What we learned from Sailors.*

Opportunities

A sample conversation with a Third Class Sonar Technician is useful in explaining some of the challenges of training on board ship. The interview (like all the 202 interviews) was one-on-one with an ERNT team member, and lasted for about an hour on board the Sailor’s command. In this case, the command had made a tangible commitment to training: the first one and one-half hours of every day, four 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, it 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 to put useful learning materials and proven, technologically advanced learning tools in the hands of leaders and trainers and improve the learning, performance, interest, and satisfaction of Sailors.

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 within the sample who were also supervisors (there were just under 90). To begin with, a majority of supervisors reported that newly reporting Sailors often 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, difficulty in obtaining slots in the courses, and manpower shortages.

Finally, the majority of the Sailors who had been exposed to technology-based training (about 175) liked it. The majority also reported, however, 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. Some 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 that 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 lists the examples that we have the room to include. In each case, we have chosen it because it embodies 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

From Today's Sailors – Islands of Excellence

Sailors told us about their "best training experiences"

- Air Combat Training Continuum
- Aegis Training and Readiness Center
- Submarine School New London
- Local Training Authority
- C3F Inport Tact Team Trng
- Interactive Multi-sensor Analysis Trainer (IMAT)
- Nuclear Power Training
- Collaboration at Sea
- Battle Stations
- Fleet Partnership Feedback Programs

ERNT

Figure 22. Examples of effective Navy training programs.

SUBSCOL is a CNET activity, it receives substantial guidance and resources from the submarine TYCOMs and N779 on the OPNAV staff.

- Local Training Authorities (LTAs). A CNET initiative, LTAs are “one-stop” training brokers in Fleet Concentration Areas. They specialize in traditional and non-traditional training solutions for Fleet ships, submarines, and aircraft squadrons; LTAs’ reach extends into the commercial marketplace for training 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 under way. 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 the learning environment of students, strengthen connections with Fleet submarines and nuclear-powered aircraft carriers, tailor training to learners, and sharpen 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 a tool for aviation acoustic operators, then 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 Corporation and Navy team. Processes and procedures were 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 that 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; we have 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. Although 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. These businesses are forced to make cost-effective investments in the performance of their employees to gain and maintain competitive advantage. The Navy's bottom line is not the same as the bottom line in the private sector. Even so, solutions developed in industry hold great promise for the Navy. We devoted a good deal of time to studying best practices in industry and 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. 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 recognize that optimal organizational performance can be realized only by focusing on people as the most important ingredient in 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 hardware and software 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 organizational performance and, ultimately, the bottom line are functions of what employees know and how well they apply that knowledge in 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 past 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 *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 a 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 which exist 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). Then interventions, such as training, are developed to provide needed KSAs to the workforce in the most efficient and effective manner (see figure 23).

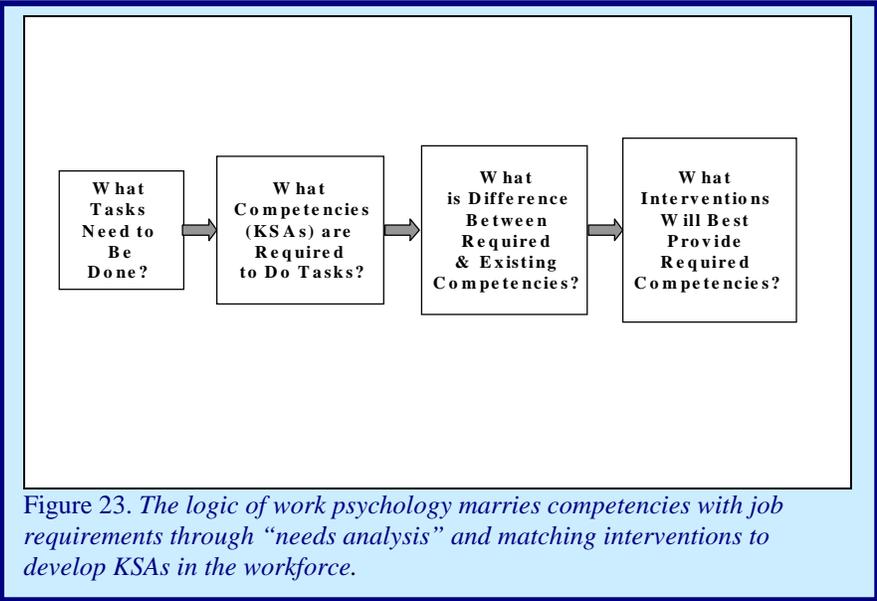


Figure 23. *The logic of work psychology marries competencies with job requirements through “needs analysis” and matching interventions to develop KSAs in the workforce.*

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 with 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 among these are 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. The Navy must place the Sailor, and the Sailor’s job, at the center of its assessment process. A Sailor-centric approach by the Navy must consider recruits’ and Sailors’ interests and desires as a basis for rating assignments and 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, that 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

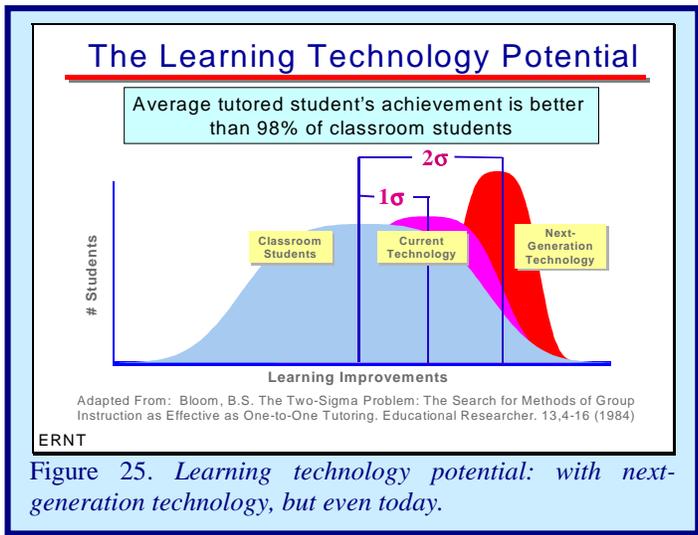
The science of learning has been the focus of a rapidly growing research field over the last three decades. At its core, the science of learning seeks to understand how individuals and teams come to acquire the competencies needed to perform their jobs. Theorists have identified basic principles of knowledge 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.

The science of learning provides great insight upon which to build effective, efficient learning systems (figure 24). 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 25). 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.

Science of Learning

- Tailored instruction is more effective than group-paced instruction
- Building confidence in learners is an important outcome of training
- Building learner self-awareness aids the learning process
- Optimal instructional design requires a comprehensive Training Needs Analysis
- Measurement & feedback are paramount to sustaining effective learning
- Learning is a continual process
- Blended human performance solutions result in the greatest improvements

Figure 24. *Important 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).

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 processes.

It has also been shown that measurement and feedback are paramount to the learning process (this is discussed further in the next 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 skills 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

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. It is also impossible, without measurement, to relate human performance investments to changes in output.

Until recently, industry (like the Navy) put little effort into measuring improvements in human performance resulting from training. Still, it is incumbent upon the training function to show value as it relates to the bottom line. Several commercial enterprises we visited are building automated 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 26). This model holds that there are four levels that must be included in a training measurement system. These levels increase in complexity and provide specific information useful to the organization. They are:

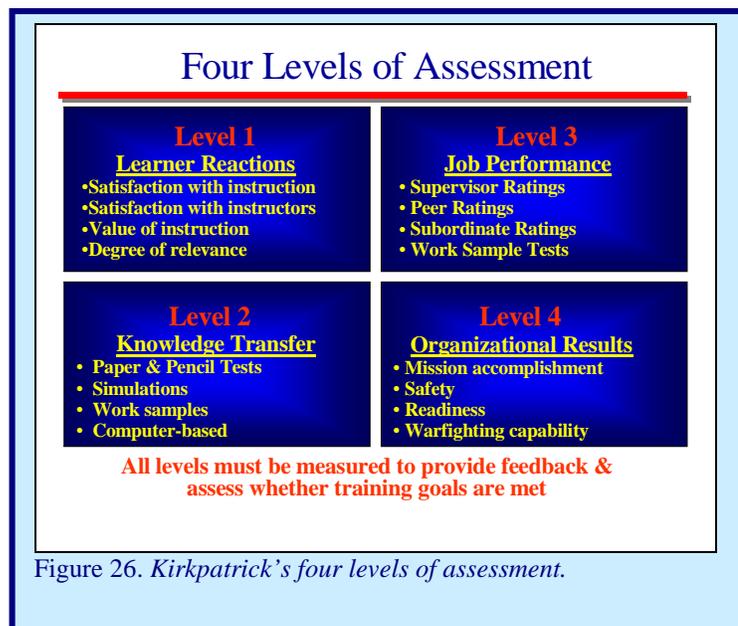


Figure 26. Kirkpatrick's four levels of assessment.

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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, because reaction measures are relatively quick and easy to collect, they are most often the only measure obtained.
 2. *Knowledge transfer*—addresses whether the learner acquired the fundamental knowledge needed to accomplish the job. This includes such things as the facts, 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. Although 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. *Job performance*—concerns itself with whether the learner has acquired the skills to actually perform the job. 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. (This is true in measuring team learning also.)
 4. *Results*—refers to whether the organization actually achieves its desired objectives as a function of training. If, for example, training is initiated to improve safety, 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 key component of the 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 and Change in Industry

All organizations—in one way or another—must transform information into valued knowledge. As summarized in figure 27, the term *organizational learning* refers to the pattern of actions, individuals, symbols, and processes that enable this to happen. It is supported by five distinct subsystems in an organization—learning, organization, people, knowledge, and technology. These subsystems are connected, mutually dependent, and must work together to allow an enterprise to achieve competitive advantage. Organizational learning is highly dependent upon the dynamic social forces within the institution. 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 a new form of labor. But 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:

- Eliminating an “up or out” policy
- Restructuring the competitive nature of promotion and advancement
- Selecting recruits for their talents vice the needs of a particular rating
- Placing Sailors as a function of their talents and interests, vice the needs of the distribution process
- Eliminating or reducing mandatory time served for advancement to the next rate
- Using demonstrated competency in required skill sets as a basis for advancement and promotion.

Organizational Learning & Change

- The pattern of actions, individuals, symbols & processes that enable an organization to transform information into valued knowledge.
- A *process* using systems thinking, mental models, personal mastery, team learning & shared vision. Success highly dependent upon the dynamic social forces (culture) within an organization.
- Organizational Learning (OL) leads to reflection, integration, reevaluation & understanding that an interrelationship between the process of knowledge/learning & action/performance exists.
- Change without understanding the organizational learning will not succeed.

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Figure 27. *Characteristics of organizational learning and change.*

Many enterprises in the past decade have attempted to build learning organizations by investing 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. What they need, as well, to be zeroing in on is 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 are going to occur. 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 findings (see figure 28).

What We’ve Learned From Industry

- Organizations are treating investments in human capital as a business strategy
- To be competitive, enterprises must attract & retain the “best & brightest”
- Training is seen as a way to attract & retain talent
- Organizations quickly adopting eLearning
- Emphasis is on knowledge management

ERNT

Figure 28. *Some of the major lessons we learned from industry.*

As we said earlier, in this competitive labor economy, employers are increasingly realizing the need to treat investments in human capital as key parts of their business strategy. Indeed, they realize that investments in their employees improve 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.

eLearning is a large part of the training revolution in the civilian workforce. What has enabled many companies to offer more training, while holding down costs, is their increasing use of eLearning. Elearning has been especially useful to corporations, which have widely dispersed workforces, like the Navy.

Recruiting & Retaining People

What do we know about the role of training and education in the War for People? As we stated earlier, the economy has presented all employers with challenges similar to those of the Navy. This has led to real changes in the workplace. Employees have new and different job 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 their 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 their 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. We will argue later that this matters because longer service obligations are linked to lengthy schoolhouse pipelines. Tailoring training to students' backgrounds, and shifting to more on the job learning, can help the Navy appeal to a larger recruiting market by reducing service obligations.

The Opportunity for College

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 continuing education. From the 1999 New Recruit Survey, 46 percent responded that money for college, or the opportunity to attend college while on active duty, was 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. 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 1996 U.S. Department of Labor 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.

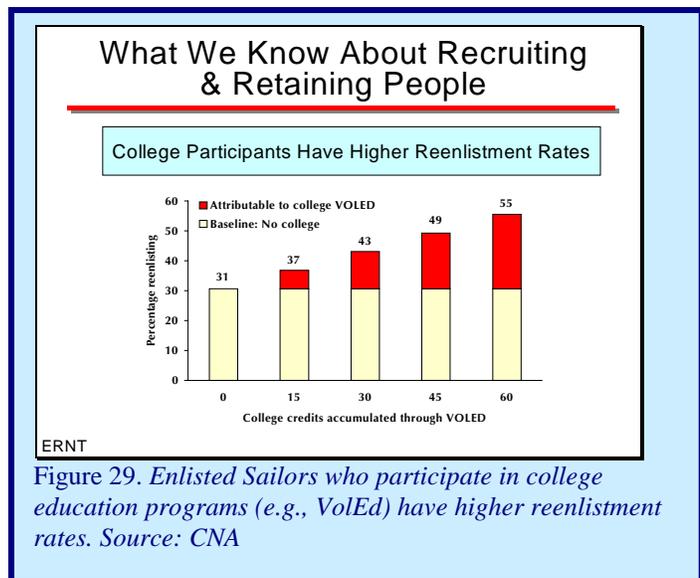


Figure 29. Enlisted Sailors who participate in college education programs (e.g., VolEd) have higher reenlistment rates. Source: CNA

We have compelling results also 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-percentage point higher retention than those who do not, after controlling for relevant factors (see figure 29). The more credits earned, the higher the retention, everything else being equal.

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

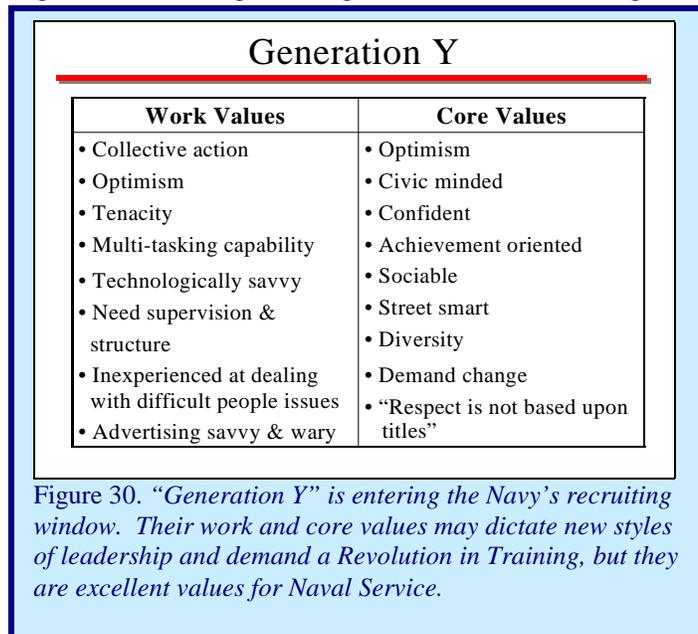
About Technology, Learning, and Change

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 (see Appendix E).

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 and measuring training effectiveness; meeting the expectations of Generation Y (whose values are summarized in figure 30) and affecting this new group’s behavior; capitalizing on Information Age technology; and meeting the significant challenges associated with changing corporate culture. Appendix E also 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 critical pillar of their corporate strategies.
- Training, and professional development in general, 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 so, senior managers and boards “invest because they believe.”
- Training is increasingly viewed as a corporate functional area.
- The training functional area is supported by knowledge management systems.
- Training is tailored to the individual learner and the specific competencies required to perform the job.

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



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- **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 and 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. “Chunks” of content allow employees to use and learn even when their time is very limited.
 - **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, forward-deployed Navy”).
 - **An enabler:** 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 percent; associated improvements are either reduction in time to train (20-40 percent) or increases in the amount of skills and knowledge gained by learners (10-30 percent). The Navy experience so far is that savings are more modest, on the order of 10 to 20 percent. Still, some specific success stories from elsewhere are said to include:

- **EDS:** The average cost of training dropped from \$60 per person to \$4 per person per day (100 percent of EDS training is done via the EDS eLearning Network).
- **U.S. Army** plans to reduce time under instruction by 30 percent in 525 reengineered courses, saving 10,000 man-years or avoiding \$155M in per diem savings per year.
- **Days Inn** achieved a 50-percent reduction (time and cost) in technology-based instruction over classroom training.
- **Circuit City** recouped its \$14M investment in eLearning in four months.
- **Multi-media and Training Newsletter** claims a 50-percent 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 also led to a 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 has undeniably been hard. In every case, successful transformations required the direct support and personal involvement of senior leaders. All organizations that have changed substantially, have experienced realignment problems—successful change often includes personnel changes.

About the Navy

In the past several sections, we have reviewed why the Navy needs to revolutionize its training, discussed lessons learned from Industry and academia, and summarized our insights from the Sailor interviews. The ERNT team also visited Navy sites, reviewed pertinent Navy programs, and exchanged ideas with key Navy leaders.

Clearly the Navy operates in a much different environment than the majority of the civilian firms we visited. In the civilian sector, employees are motivated to learn because their increased skills and competencies can be directly converted to promotions and increased pay. The rewards, and the potential losses, in the civilian sector are undeniably greater than in the military. Yet, despite the significant risks of change, leading civilian industries are aggressively implementing eLearning and, in fact, becoming Learning Organizations. In many cases leaders in the commercial sector feel they have had to do this to survive.

Despite our tendency to exaggerate the differences between military and civilian environments, we found surprising similarities between the two types of organizations—similarities in job/skill tasks, size and scope of operations, concern for safety, and concern for the readiness/proficiency of the workforce.

We are convinced that the Navy must also become a Learning Organization. This change will be difficult, and *some basic Navy assumptions must be explicitly challenged*, assumptions that 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.

The Navy must become a Learning Organization to become an “Employer of Choice” in the 21st century. The Sailor must become the “customer.” 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 learners, and not be satisfied until the learners’ needs have been satisfied and performance has improved to the level required by the Fleet.

Our discovery efforts have convinced us that the Navy will need to make some fundamental changes in leadership responsibilities. We expect 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. We recommend:

- Executive Officers become Chief Learning Officers. Seconds in command in all Navy commands and activities should also be the “learning officers.” 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.”

-
- Executive Officers Fleet-up. 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 across the Navy.
 - CMC/COB – Human Resource Managers. As the "Chiefs Mess" has matured, its members have become even more than the leaders and technical experts they have always been. The Chiefs are now human resource managers in every sense. The Command Master Chief and the Chief of the Boat must be in the lead, marshalling the skills and enthusiasms of the Chiefs to support the Learning Officer and the Commanding Officer in obtaining the benefits of the Revolution in Training for their Sailors.
 - Sea Duty Instructors. The Navy should strive to develop a cadre of training experts on board the commands: "thousands of teachers" our ERNT teammates called them. Skilled in the use of eLearning or other learning media, these people will be the resources at-hand in every teaching and learning situation for the operating forces.

These types of changes will obviously challenge some closely held Navy traditions. 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 somewhat at odds with its current environment. The Navy must change again.

Our discovery efforts have also revealed several concerns. In some cases these may lead to squandered opportunities:

- Learning as an entitlement. Personal and professional 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.
- Time to train. Sailors, and their supervisors have told us that one of the most significant impediments to training and education is the lack of time. Industry has experienced similar shortfalls in time; in fact, it typically does not provide any time during regular work hours for its employees to train. However, leaders in industry have found that Distance Learning and eLearning, with their "chunkable" learning units, offer at least a partial solution to the press of time and priorities on learning.
- Pervasive access. Sailors must be able to "plug-in" and receive training anywhere at any time. The Navy has invested significantly in the Navy, Marine Corps Intranet (NMCI) and its sea-based comrade IT-21. The majority of industry leaders we visited had similar intranet strategies—pipes with HR applications accessible from the office, on the road, and at home. We are concerned, however, that the terms of the development of NMCI do not pay sufficient, explicit attention to the on-line learning needs of Sailors and groups of Sailors. This is an extraordinarily important matter to clarify, and correct if necessary.
- On-the-Job Training (OJT). 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. We imagine great returns from relatively modest investments in learning tools placed in the hands of leaders in ships, submarines and aircraft squadrons.

- General Military Training (GMT). There is no rhyme or reason to how the subjects are selected; the media appears to be automatically boring lectures; and there is little or no feedback about whether or not these interventions have actually modified behaviors. “Starting over” might be required.
- Rewards & Incentives. The Navy’s rewards and incentives do not encourage individual Sailor initiative and personal responsibility in training and education.

CNO Year 3
The Manpower, Personnel & Distribution Revolution

- Review Navy’s current Manpower, Personnel & Distribution system, organization & processes to improve management of Human Capital
- Some potential issues
 - Manpower requirements determination process
 - Rewards & Incentives
 - DOPMA
 - Lateral entry
 - Career paths & tour lengths
 - Education opportunities
 - Instructor incentives
 - Validity of enlistment contract
 - Ship, sub, squadron crewing policies

Figure 31. *Things in HR to be studied next. Potential issues here have profound effects on the success we project for the Revolution in Training.*

- Block/Optimal Manning. Operational units are subject to nearly continuous rotation of crewmembers. Two to three percent of the people assigned to a ship, submarine or aircraft squadron depart each month. This has profound implications in team building and training. Alternatives to continuous rotations have been studied in the past; some alternatives have real promise in terms of leveraging teamwork and collaborative learning to improve combat readiness. We recommend they be evaluated again.
- Other Human Resource Issues. In fact there are many human resource issues (that are beyond the purview of the Executive Review of Navy Training) which will have a profound effect on the outcome of the Revolution in Training. We recommend (see figure 31) that these issues be studied, and acted upon, soon.

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 led us to several fundamental tenets on which to base our recommendations.

In addition to the tenets noted in figure 32, we have learned that:

- The Navy must focus on learners’ needs, measure performance, and use every means available to improve human performance.

Principal Tenets

- People are the key resource of the 21st Century
- Learning is the new currency of labor in the knowledge economy
- Training and education are the center of gravity for creating an agile, responsive, flexible Navy
- New technology is a powerful tool for delivering blended training anytime, anywhere
- Processes and doctrine must be adjusted to reflect understanding of new realities
- Change is hard. It requires continual assessment, adjustment, and fully integrated partnership between fleet users and headquarters staff
- Changes to traditional cultural norms and accepted practices are inevitable

ERNT

Figure 32. *Principal tenets.*

- Application of the science of learning to Navy teaching, training, and education will be at the core of the Revolution in Training.
- Commanding officers, other senior khaki leaders, and especially the Chiefs Mess must be made to see value added by the Revolution in Training.
- Sailors must be able to learn while in their commands and on the job. Today, leaders in ships, submarines, and aircraft squadrons too often are confronted with this 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?
- Selecting and classifying Sailors for the right career track and satisfying their education and learning needs are the most effective ways to meet the requirements of learners, maintainers, and operators.
- Worldwide (24/7) access to the highest quality eLearning must be pervasive; materials for learning and growth must be accessible to all Sailors, all the time.

• Success of the 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 (in figure 33) are critical to the creation of appropriate cultural values for development of a continuing and increasing 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 responsive and responsible to the Fleet and to Sailors for learning and performance.

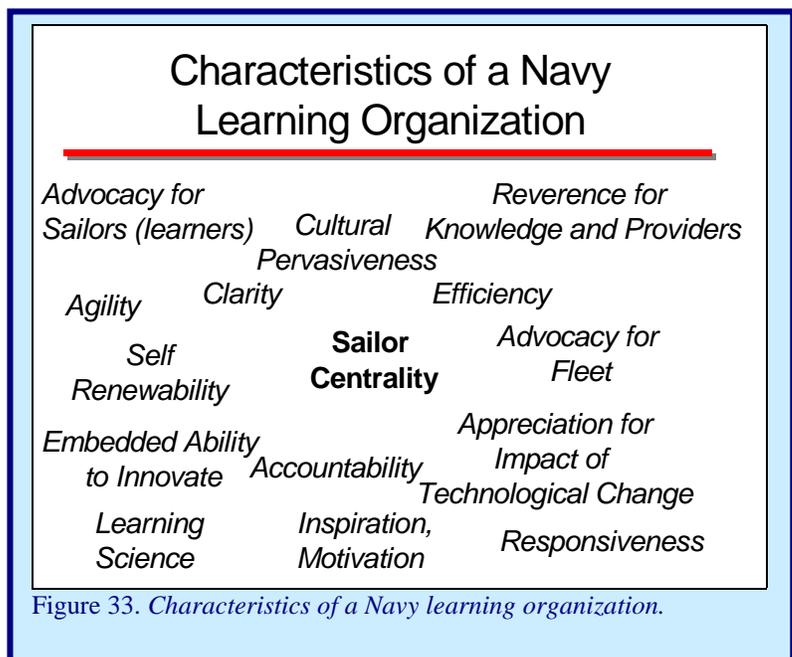


Figure 33. Characteristics of a Navy learning organization.

- The Navy must identify, adopt, and exploit best practices, whether from the private sector or from the Navy's own "Islands of Excellence."
- Training and Education technology has allowed the private sector to make extraordinary leaps in effectiveness, efficiency, and performance. 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 readiness.
- Top Navy leadership must be actively engaged in implementing change.

In Section IV we will fold most of these ideas into the four major recommendations stemming from the Executive Review of Navy Training.

IV. ERNT Recommendations

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

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 training plan? We summarize our answers below.

- There are at least 63 commands that sponsor/generate Navy training requirements.
- Most training requirements are not validated by Fleet CINC(s) or their equivalents.
- At least 48 separate commands can meet some Navy training requirements.
- There is no Navy training strategy. Money drives training, and commands with money make independent decisions about which training requirements are met and how they are met.
- The Navy does not do front-end analysis for requirements. The fundamentals of the science of learning are not applied to determine the best training delivery system.
- There is a complex web of independent training policy and execution organizations. 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 training should be added. There is only incidental communication of these “requirement reviews” to the OPNAV sponsor—the only staff that can adjust resource plans outside of the current fiscal year.
- 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 “Councils of Captains”). Although the Councils were developed only 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 exams. We found no evidence of a feedback system that measures whether the training meets the requirement or improves the performance.
- 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 other than traditional classroom-delivered curricula.

The current process for determining the basics of training (i.e., the who, what, where, when, and how) needs to change. Not only does the Navy lack a training strategy, there is no “Navy Training System” to allow for innovation and rapid response to new technologies, or ideas. It is clear that there should be.

If all performance deficiencies are written as training requirements, there is an inherent bias toward developing solutions that rely solely on classroom instruction. In the end, this leads to training that relies, almost exclusively, on the formal schoolhouse 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 its objectives.

Recommendation #1: Adopt a Navy Human Performance System Model

We recommend a Human Performance System Model (HPSM) to represent a new set of fundamental, often behind-the-scenes, processes. Figure 34 shows a simplified representation of this four-quadrant process. The HPSM starts, in quadrant I, with a statement of human performance requirements (what tasks do Sailors need to be 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?). We will proceed with a more thorough description of the model. (For the details, please see Appendix F.)

Quadrant I: Define Requirements

The first step in the process, found in quadrant I, is to define human performance requirements. We recommend that the Fleet Commanders in Chief (CINCs), the Chief of Naval Personnel, the Director of Naval Reactors, and certain other, “equivalent” decision-makers (for specialties, for example) approve all human performance requirements. Operators, Sailors, trainers, performance consultants, senior commanders, and CINCs can better understand requirements and associated measures of effectiveness and performance if requirements are defined 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) will validate and prioritize them to determine specific job performance standards (we talk more about the role of the CINCs later in this section). In addition, job performance requirements will be defined as appropriate for different stages of Sailors’ careers (apprentice, journeyman, or master) based on the level of proficiency demanded by the jobs.

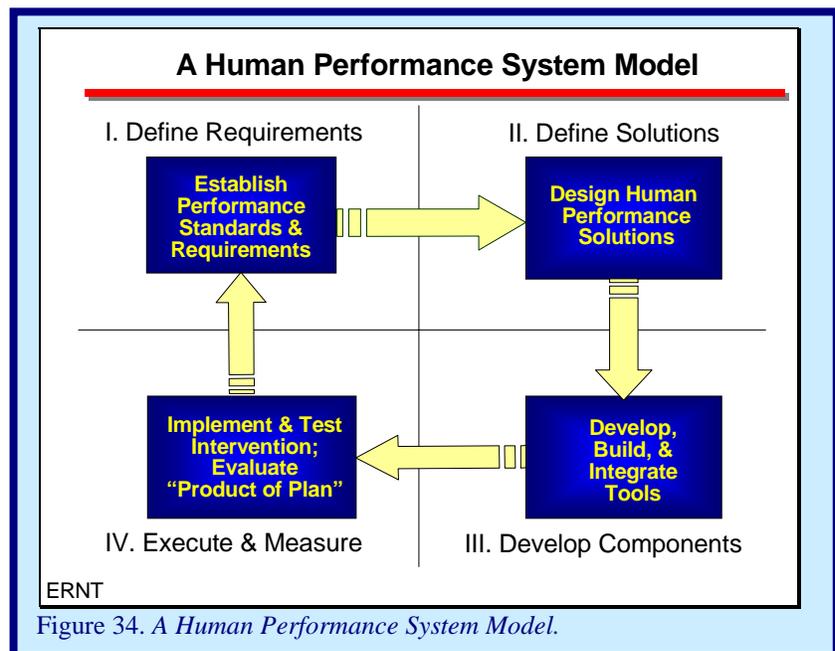


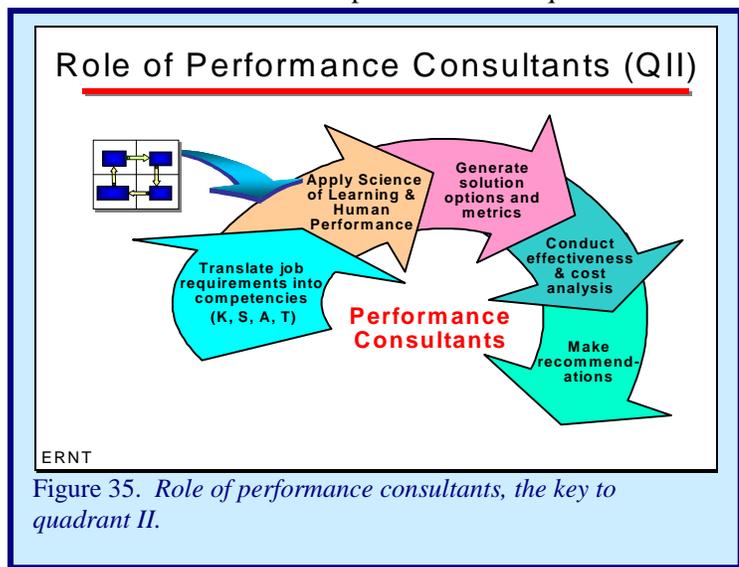
Figure 34. A Human Performance System Model.

Quadrant II: Design Solutions

The input to this quadrant is human performance requirements that have been defined, certified, and prioritized. In quadrant II a menu of options for performance interventions will be developed. Performance 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 warfighting capacity. In the real world of constrained resources and conflicting interests, the CINCs may establish performance criteria to achieve less than optimum performance (i.e., readiness levels C2 or C3) in certain areas in order to place more emphasis on other, higher priority areas. This trade-off is currently performed by the 11 OPNAV divisions that program and budget training resources.

Figure 35 provides some details on the process in quadrant II. 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 to accomplish the job or task? Competencies can be expressed in terms of knowledge, skills, and abilities (KSA). Other models factor in attitudes as well. Once competencies are established, the range of possible ways in which 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 limiting consideration to only schoolhouse training solutions. Decision-makers can evaluate the importance of other enhancement solution options such as:



- Manpower adjustments (in staff size, experience required, etc.)
- Structured on-the-job experience
- Improvements in technical support
- Job performance aids (e.g., wearable hardware)
- System redesign (changing the human task at the same time)
- Changes in operating or maintenance procedures.

An essential part of the HPSM is the contribution of the performance consultants. Industry is increasingly 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.

Part of this recommendation is also to create enough performance consultants (in government or contracted) to determine the right set of performance-enhancing tools for each of the Navy’s human performance requirements. For the long term, we believe that many of the Navy’s civilian education specialists will need additional training and education, but will be able to become qualified performance consultants.

Performance consultants are trained in and experienced at understanding human performance and competencies. They 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. 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, when performance consultants are most effective, they work closely with subject matter experts and end users. In fact, it is almost always the case in industry 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. This is a definite departure from the traditional, and more limited use of education specialists only as long-term curriculum design experts.

The final step in quadrant II is passing the “menu” of interventions to the CINC, or other equivalent decision-maker in quadrant I, for selection of the human performance solution to be developed and deployed.

Quadrant III: Develop, Build, and Integrate Tools

As noted above, the solution options generated in quadrant II are passed to the decision-maker in quadrant I. The CINC, or equivalent, will select the appropriate intervention(s) based on effectiveness, cost, and so on. The choice(s), then, are passed to quadrant III for coordinated development. A number of processes and organizations may contribute to the building of the integrated components of the solutions. Solution options can include traditional classroom instruction; eLearning; job performance aids; electronic performance support systems; manpower adjustments; on-the-job-training; integrated electronic technical manuals (IETMs); simulations, models, or games; experience; job redesign/automation; and so forth. 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 place in the competitive marketplace (see sidebar). Then the tools, the training solutions, are passed to quadrant IV.

The Marketplace: Quadrant III

The intent here is to exploit the best technology, tactics, and techniques available anywhere in putting these training solutions together. Navy training activities, warfare centers, SYSCOMs would compete for this business with the best of industry and academia.

Quadrant IV: Execute and Measure Effectiveness

Quadrant IV is where both the execution and the evaluation of the intervention occur. It is where the product of the plan is measured to determine whether expectations for improvements in human

performance have been met. 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, CINCs carry out level 3 and 4 measurement and use the data 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 evaluates the product of the plan. This feedback includes answering these questions:

- 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 CINCs (or CINC-equivalents), as well as performance consultants and executors, will receive information on whether the original objectives were met. This information will then be used in quadrant I for refining performance requirements and in quadrant II for evaluating the intervention strategies. The end users determine human performance requirements and are involved in both the first and last steps of the process. They are key to the operation of this model for continuous improvement based on direct feedback, changing operational needs, and advances in technology.

Conclusions About the HPSM

There are compelling reasons to make this change. In the HPSM, job requirements initiate the process, which has several advantages. First, operators know what tasks are required to form high performance teams. Second, performance consultants can translate required tasks into human performance interventions that are most likely to achieve the competencies required to successfully complete the tasks. Third, instructors and others who are powering the training system modify on the fly because they can easily see which changes will be helpful to students. Fourth, because the requirements are defined as tasks, they are easier to understand, test, and modify. Lastly, the sponsors of the requirements can more 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 Fleet CINCs), the Director of Naval Reactors, and the Chief of Naval Personnel. Job performance requirements can be validated so that redundant and outdated requirements can be deleted. Requirements can also be prioritized by those closest to the operations.

In addition, 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 Navy performance consultants to offer the best menu of blended learning solutions by determining explicitly what is necessary to meet job performance requirements.

This model suggests that Navy’s use of “training requirements” has led to traditional and (sometimes) 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 F). Training, as one of many performance-enhancing tools, is merely a method of

meeting a job performance requirement, not a requirement itself. As part of this Revolution, we recognize that there are only “job 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 performance development system.

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 will guide the formation of solution options for performance issues. In an earlier section of this report, we said that 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.

Because people learn in a variety of ways, and also differ in how they retain knowledge, we need to apply the science of learning in developing a framework for an effective and efficient learning system. The Navy Learning Model we are proposing links theoretical learning concepts to the practical applications of Navy training. The Navy Learning Model comes into play in the four-quadrant model (in quadrants II and III) in the design and development of interventions for improving human performance.

The Navy Learning Model (figure 36) describes several ways in which people learn, arranged into a framework that can be used to design training delivery methods. We began by adopting the learning model used by the IBM Corporation. Using one version or another of such a model, corporate leaders and learners alike can appreciate the 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 using this model when designing training solutions at the unit or group level.

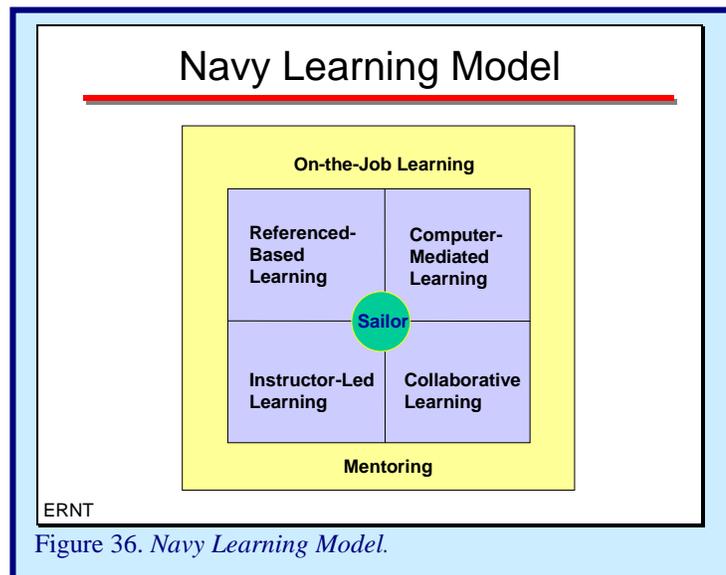


Figure 36. Navy Learning Model.

The four blocks in the center of this Navy Learning Model represent four major methods of learning. The surrounding learning level, *On-the-Job Learning* and *Mentoring*, reflects 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. This component 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. It is often just reading, and 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 realizing the potential of reference-based learning. Developing the appropriate human-computer interface is essential when technology is involved. Examples 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 intelligent 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/or instructors can lead dispersed students in "netted" classrooms. Other examples include traditional classrooms, laboratories, role-playing, and study groups.

On-the-Job Learning and Mentoring. Learners in this category interact with their own equipment, workmates, and/or situation as a mechanism for learning. This is the category into which continuous learning environments fit. OJT and mentoring require an appropriate climate for learning. OJT can be individual or group-based. This category also includes specific mentoring by leaders on the job. 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 skills and abilities of leaders to mentor their subordinates and of peers to mentor one another. (These are things that leaders and peers can be taught.) Examples of this category include: embedded simulations/stimulations, mentoring and coaching, continuous learning, guided team self-correction, learning through 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 delivered and assessed in quadrant IV. This further enables today's training 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 System 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 CINC(s), then address the possible changes in duties for others. 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.

In quadrant I, the CINC must validate all individual, unit, and group job/task requirements (figure 37). This requires a direct job-task-skill competency linkage. Today, the Navy has broad Battle-Group-level tasks that are generally linked to Joint Mission-Essential Task Lists (JMETLs). The Navy is gradually developing the associated Navy Mission-Essential Task Lists (NMETLs). This linkage is essentially severed before reaching the individual Sailor level, where rating requirements generally are based on

CINC Roles & Responsibilities

- Requirements validation
 - Establish job performance requirements
 - Define acceptable risks
 - Prioritize requirements
 - Approve Quad II recommendations
- Performance assessment
 - Evaluate/measure effectiveness of intervention
 - Periodic review
 - Collect performance data
 - Evaluate risk

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Figure 37. CINC roles and responsibilities in defining performance requirements and evaluating the product of the plan.

knowledge-based occupational standards (OCCSTANDARDS) rather than task-based job performance needs.

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, or CCG 1 and CCG 4
- 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 (e.g., cost, timeliness). We discuss a Human Performance Systems Organization in the next section. The CINC may choose something less than the optimum solution. The CINC's choice will in any case then become the target objective for Fleet performance measurement.

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, and the staffs of other decision-makers.

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 for direct feedback to the original solution provider.

A few other Navy officials should have (as we have said) 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 of the proposed Human Performance System Model. Position 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 from the best sources elsewhere. In the short term especially, 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 relative contribution to warfighting mission value.

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

- Applying science of learning and human performance considerations to Navy job requirements
- Analyzing and diagnosing performance problems
- Developing performance measures
- Providing learning objectives
- Generating knowledge, skill, abilities, (KSAs) and providing tools
- Developing and recommending blended human performance solutions based on the Navy Learning Model
- Transitioning research and development innovations
- Maintaining a 24/7 help desk for human performance problems
- Maintaining internal workforce Navy currency in science of learning
- Assessing the cost effectiveness (e.g., return on investment) of performance and learning solutions
- Developing and maintaining Navy-wide strategic learning plans (simulators, eLearning, 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 38).

The hub (or core component) would provide the centralized control and continuity, maintain connectivity with industry and academia, and develop and manage "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.

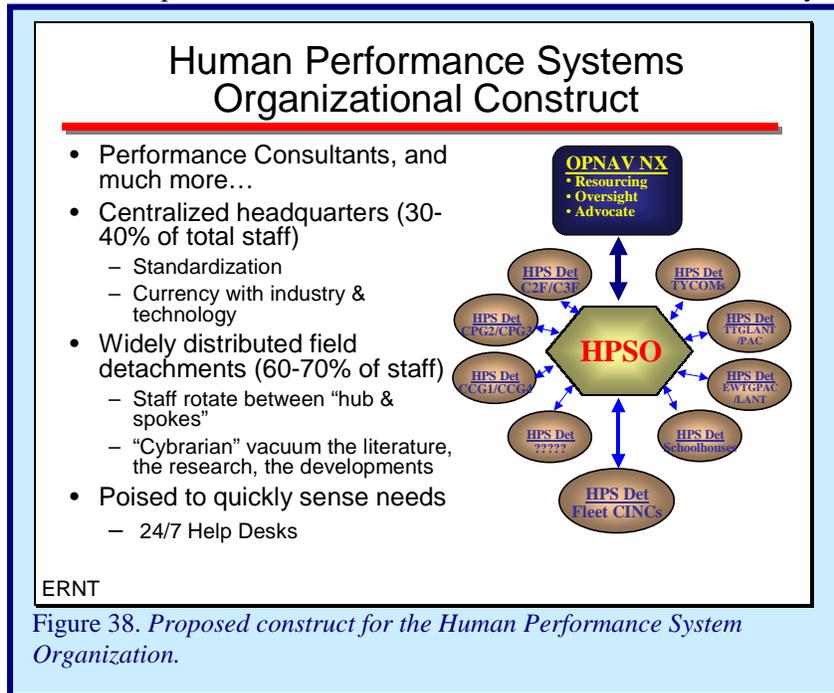


Figure 38. Proposed construct for the Human Performance System Organization.

The spoke component (i.e., field detachments) would function as the “browsers.” They would be located with the customer, fully immersed in the Fleet environment, fully accessible and well known to warfighters in the Fleet concentration areas. They will be assigned to the Fleet CINC and Type Commander staffs, at schoolhouses and training commands, with CVBGs and ARGs, and wherever else they are needed. In short, they will be positioned to respond rapidly to human performance problems at the individual, team, unit, Group, and Fleet

levels. We believe that human performance consultants should rotate between the field and the HPSO core to sustain a high level of Fleet experience. We also believe that certification in performance consulting should be accompanied by compensation and other career benefits.

To whom should this HPSO report? The ERNT considered several options:

- To the Fleet CINC(s). As previously discussed, we see the CINC(s) (and their equivalents) as responsible for establishing the warfighting requirements, determining the acceptable level of risk, assessing the success of the training interventions in the IDTC, and 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, with N79, currently oversees much of the Navy’s training establishment.
- To OPNAV N9. The 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. (More on the N9 recommendation later in the report.)
- To OPNAV N1. CNP owns the manpower portion of the human performance solution.

In the near term, we recommend that a “virtual HPSO” core be established at Naval Air Warfare Center–Training System Division (NAWC-TSD). As with all Navy laboratories, NAWC-TSD is heavily immersed in technology and tools development. However, NAWC-TSD also supports all warfare communities and is active in the Joint arena. Furthermore, it is geographically immersed in a corridor of emerging modeling and simulation technology development in Orlando.

This virtual HPSO should begin by addressing current high-priority human performance issues (selected by the Revolution in Training 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

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 an 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 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 eliminated by realignment of the Navy's training organization.

Establish an Integrated Training Organization

The Navy suffers because it does not have a single entity responsible for training and human performance. Although training problems are cumbersome to deal with due to fragmentation 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 job skill requirements, it would discover striking similarities among warfare areas in fundamental training requirements. This could allow the Navy to eliminate its secular institutions and develop facilities that thrive on common

objectives. Navy-owned industrial centers in major FCAs would lower the cost of training, and improve quality and responsiveness to Fleet needs.

The ERNT team looked for a way to alleviate the adverse impact of the fragmented training structure with 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 (Initial Skills Training (IST), Specialized Training, F/T schools)
 - All Officer and Enlisted pipeline and Fleet training (Fleet Replacement Squadrons (FRS), NSAWC, ATRC, etc.)
 - All IDTC training
 - All education commands (U.S. Naval Academy, Naval War College, Naval Postgraduate School, etc)
 - Sailorization commands (Recruit Training Command (RTC), Service Schools Commands (SSCs))
- 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 delivery of individual and unit-level training must be controlled, coordinated, and prioritized by a single entity. This entity should:

- Manage quadrant IV in the 4-Quadrant Model
- 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
- Be responsible for the completion of the IDTC requirements, as stipulated by Fleet CINC(s), C2F, C3F, and the TYCOMs
- Manage all schoolhouse training, including A, C, G, F, & T courses

-
- Identify 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.

Realign OPNAV Training Responsibilities

During our initial research phase, recall that the 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 although 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 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 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.
- Principal authorities are wearing “dual hats,” which weaken central authority and diffuse training leadership.

Consequently, training responsibilities remain dispersed and fragmented at the OPNAV level, and each OPNAV division establishes its own training policies and practices. This leads to fragmented and inconsistent execution at the lower echelons. As a result, we found that there are only “islands of excellence” in Navy training today. Organizational alignment, from OPNAV to the small training unit, is required for the Navy to share the best practices across training organizations.

Organizing OPNAV properly is even more critical if an important 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. 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 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 essential to changing 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 Division Director reporting to N7 (status quo—N79)
- An Assistant or Deputy Chief of Naval Operations (N9) reporting directly to CNO
- An Assistant DCNO reporting to N1/CNP (N1C)
- A separate Training Division Director reporting to VCNO or an Assistant VCNO for Training (N09T).

Among the alternatives mentioned above, we recognize that various OPNAV organizational arrangements, including the current one, could be made to work. 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 composed 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. Other 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 30 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 39 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 principals 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).

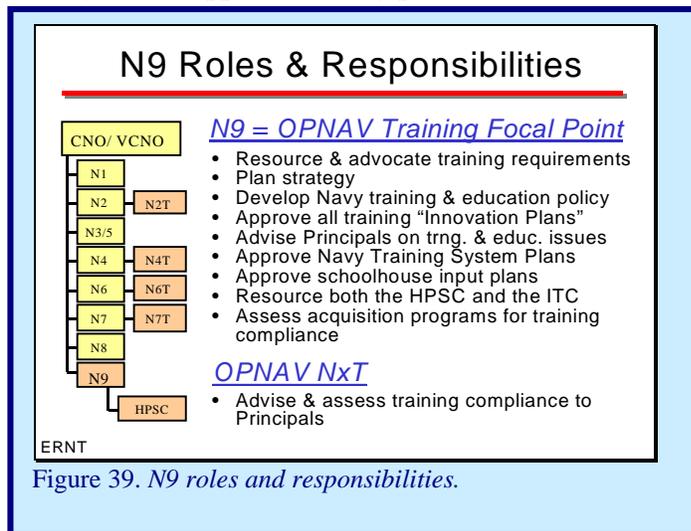


Figure 39. N9 roles and responsibilities.

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 would be transferred to N9.

Establish a Transformation Command

Balancing recruit quality mix, rating, and community health, and Fleet needs with all-Navy endstrength requirements is a complex task made more difficult by competing interests of partner organizations and limited resources. Navy endstrength 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 recently at 150 percent or more of Navy requirements, while others remained grossly undermanned. Alignment of the recruiting and Recruit Training Command efforts, under the auspices of a Transformation Command, would help unify the process and the goals of the organizations and allow smoother personnel policy and strategy decisions. The ERNT considered several reporting options for a Transformation Command:

- To the VCNO, which would force this 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).

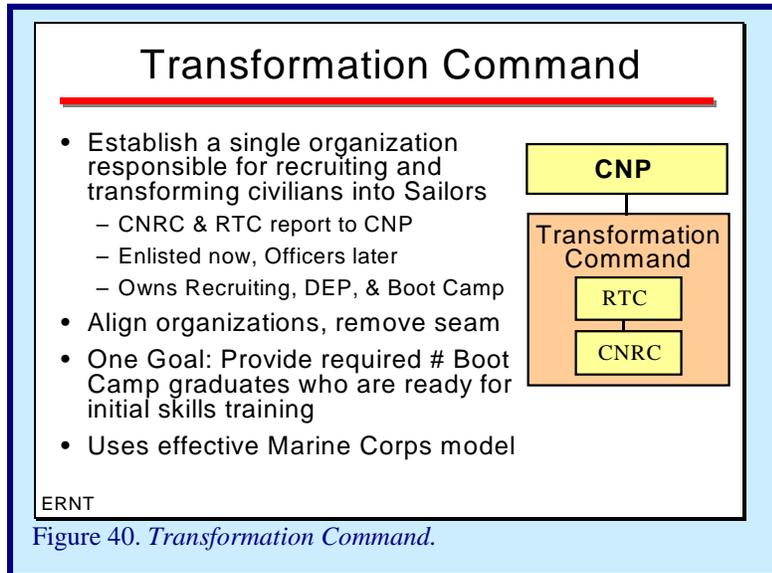


Figure 40. Transformation Command.

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 (figure 40). This alignment would result in a 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 within one command.

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.

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 beginning Sailors’ 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 (figure 39). 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 enable Program Managers to make sound human-centered design decisions and to ensure they consider training early in the system design.

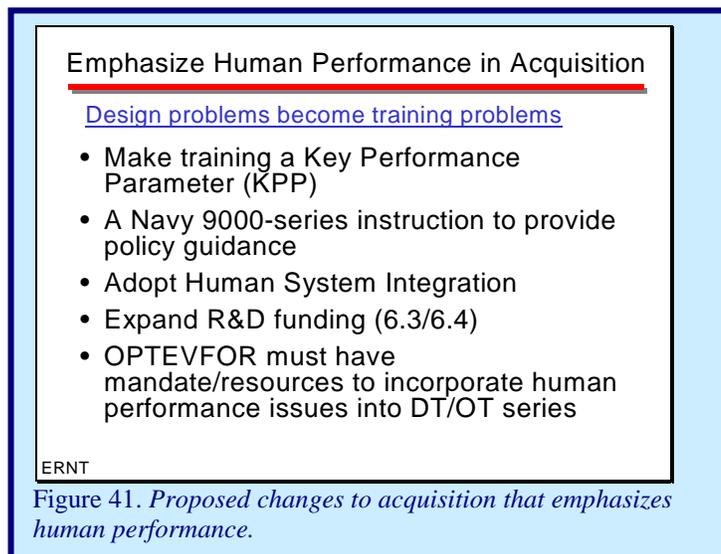


Figure 41. Proposed changes to acquisition that emphasizes human performance.

More importantly, the Navy must fundamentally change the acquisition process to reward program managers for actively considering training. 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. Formally mandating human performance, training in this particular case, as KPPs will force program managers, resource sponsors, and programmers/budgeters to exercise increased discipline.

Several other changes 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 developmental and operational testing.

Second 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. The training community must team with ASN(RDA) to develop acquisition-related policy that ensures optimal training and human-performance design.

Third, the overarching process of Human Systems Integration (HSI) must include 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.

An Exemplary First Attempt

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 crewmembers. 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 Sailors and a threshold of 150 Sailors. 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 ship's 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 and policy issues also must be addressed. The DD-21 Program Office has established a "Policy Clearing House" to work these issues.

Finally, 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 designed for the warfighter. This is especially true 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 the thread that unifies numerous individual projects and initiatives into a single, unifying concept that unequivocally proclaims the Navy’s commitment to its Sailors. 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 (sometimes) underutilized resource. This continuum must address and eliminate the inefficiencies and dissatisfiers that we identified earlier in this report. It must capitalize on the Navy Learning Model, the 4-quadrant Human Performance System Model, the alignment of training organizations, and the acquisition recommendations outlined earlier in this report. How then do all these organizational processes and tools fit together?

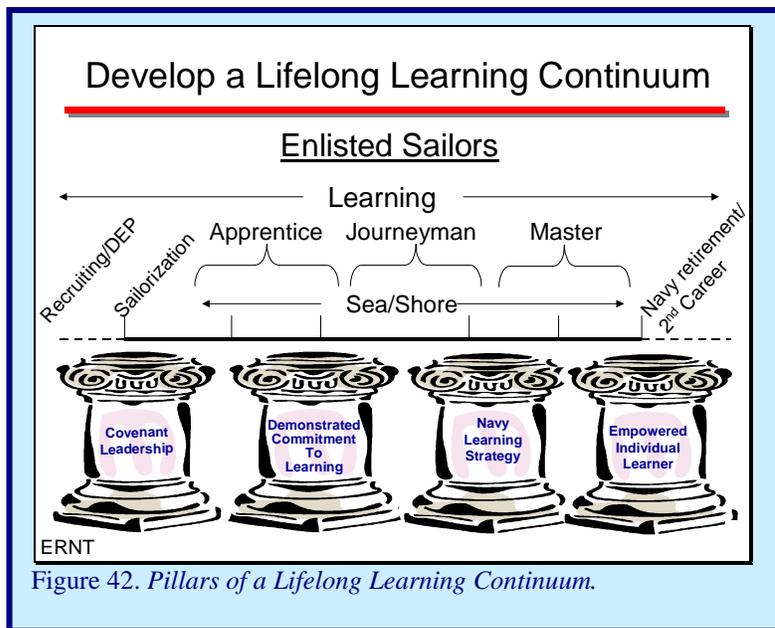


Figure 42. Pillars of a Lifelong Learning Continuum.

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 42. These fundamental principles are *Covenant Leadership*, a *Demonstrated Commitment to Learning*, a *Navy Learning Strategy*, and an *Empowered Individual Learner*. Together, these values will shift the Navy’s culture 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.

It is important for the Navy to embrace this concept—principally for the explicit signal it will send to the Sailors.

We feel the embrace of the continuum should begin the moment a recruit signs an enlistment contract and commits to the Navy; it should begin the moment an officer candidate takes his or her oath; it should continue throughout his or her career and into retirement. Since we will emphasize the Enlisted continuum here, 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; the support team whose members have also implicitly signed on to serve their nation.

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. The Navy has accepted an explicit responsibility to ensure the safety of its young Sailors away from home for the first time. The Navy and its leaders have an implicit obligation 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 them in context here, Navy leaders must:

- Be responsible for their own and their subordinates’ professional development
- Ensure that training is focused and relevant
- Aggressively eliminate “human wastage”
- Encourage 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

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.” While this is true, Sailors must also learn and improve their performance in combat—perhaps even more so.

This principle is simple—the Navy must remove the “message mismatches” we heard about so frequently during our Sailor interviews. If training and education are truly important, the Navy must balance resources and requirements. Our report has identified several specific actions that 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

-
- Maximize human performance in acquisition
 - Aggressively identify, adopt, and exploit “best training practices”
 - Design the optimum solutions and media for the given human-performance requirement
 - Assign really good Officer and Enlisted Sailors to training jobs
 - Value and reward instructors.

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 everywhere in the Navy, for all warfare communities, for all tasks and skills. As discussed in the HPSM, all job requirements should be reviewed and defined by competencies (knowledge, skills, and abilities—KSAs). Training objectives and delivery must be based on KSAs. This end-to-end relationship must extend all the way from the individual to the unit to the group. 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 manifest in the following actions:

- Implementation of the 4-quadrant Human Performance System Model
- Adoption of the Navy Learning Model
- Embracing the science of learning
- Developing objective, performance-based metrics (levels 1-4) at the individual, unit, and group levels
- 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. This requires a significant change in the Navy’s reward and incentive programs.

Empowering the learner involves ceding some control 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
- Creative participation
- Achieving growing proficiency
- Living in a continual learning mode.

Career Progression

The learning continuum affects each phase of the Sailor's career differently. Our discovery efforts highlighted several new technological applications that were not available even a few years ago. In this section we highlight some of the tools that we feel would play a significant role in improving a Sailor's career. We 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, & Boot Camp) Phase

The continuum starts with the recruiting/DEP phase of a Sailor's career (figure 43)—a phase in which the Navy has traditionally spent little in terms of education and training.

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

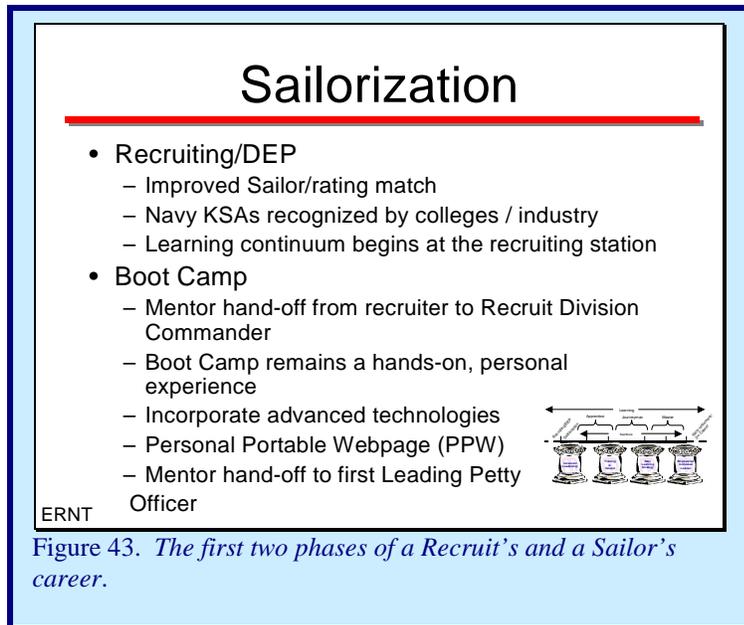


Figure 43. *The first two phases of a Recruit's and a Sailor's career.*

The Navy has difficulty recruiting people who already are trained. 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 an untrained high school graduate. In these cases, the Navy pays for training the individual does not need or want. When jobs are based on KSAs and paired with people in whole-person assessments, the Navy will benefit from 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.

We also propose that the Navy expand learning opportunities for those in the Delayed Entry Program (beyond the PQS standards that currently exist). For instance, by making use of the Internet to offer eLearning, DEPer 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 DEPer to learn PQS material and to take tests on their own time and at their own pace. These learning opportunities appear to have been productive.

We believe that it is important for mentoring to become an integral part of everyone's job. In this spirit, the recruiter (the Sailor's first mentor) should hand off the recruit to the Recruit Division Commander (RDC) at boot camp. The world-wide web can provide the forum for these transfers of responsibility. 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. Recruiters will continue to chat with Recruits in training at RTC. This has the potential to reduce attrition and to enhance the entire boot camp experience.

Upon arriving at boot camp, Recruits will be provided with a Personal Portable Webpage (PPW)—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 eLearning, and so on. In terms of career enhancement, the PPW will be populated by the personal career plan and the learning plan for each new Sailor and will be developed and updated at important career milestones with the Sailor’s supervisor/mentor. At each mentor handoff, the Sailor’s PPW will also be updated with information concerning recent duty, accomplishments, training, and so on, and a learning plan revised for the Sailor and his or her 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 (figure 44). It will allow for assessing Sailors’ KSAs before training begins, and inserting them 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 of their learning process. We also believe strongly that all Enlisted Sailors should achieve basic skill levels in reading, writing, mathematics, and life skills before leaving the apprentice phase.

As depicted in figure 44, 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. We recommend

Apprentice Phase

- Initial Skills Training
 - HPSC recommends optimum delivery strategy
 - Targeted, Tailored, Streamlined
 - Eliminate training redundancies and irrelevancies
 - Reduced time-to-train
 - Improved detailing: KSAs will enhance Sailor/job fit
- Must utilize skills immediately
 - Avoid TAD (FSA, FP, MAA, Waste Management)
 - “Ask the Chief”
- Exams and warfare qualifications will test knowledge *and* performance
- Greater cross-rating opportunities



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Figure 44. *Apprentice phase.*

strongly that such TAD assignments as Food Service Attendant duties, be ended 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 immediately after initial learning are cemented and retained best. Skills that languish during TAD assignments are 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, and involve simulators, virtual reality programs, and web-based applications. We recommend that assessment of job performance be the dominant determinant of eligibility to advance.

We believe that a KSA-based training and requirements system will facilitate a Sailor’s opportunities to change ratings. Evaluating a Sailor’s KSAs may allow Sailors to change ratings without having to

complete the entire curriculum for the new rating. Sailors should be able to initiate a shift in rating by learning much of what is needed for the new rating. Then, the Sailor can be trained only in the new skills, and the Navy will save 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 could 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 on feedback from users, and a respondent becomes ranked over time by peers. We suggest that such a tool could be invaluable in capitalizing on the trust and compounding the knowledge within the Navy.

Journeyman Phase

During this phase, advanced skills/knowledge will be acquired both on shore and at sea (figure 45). The goal is to build upon basic competencies, with Sailors setting their own pace. Intelligent, motivated, and competent Sailors should accelerate, from the career perspective, away from their less motivated peers. This cannot occur in today’s personnel and distribution system. We believe Enlisted Sailors should strive for associate’s degrees (or higher) during the journeyman phase. They should be able to combine credits earned from formal Navy technical training with credits earned while attending a compressed curriculum program to do so. Certification as a journeyman in a civilian occupational field is also an appropriate aspiration.

We also recommend the Navy develop a “Sea-Duty Instructor” program. These instructors could assist the unit’s Chief Learning Officer (the Executive Officer) in the management, coordination, delivery, and assessment of command training. This process

would provide a cadre of trainers who would be able to assist in administering meaningful shipboard training. It would replace “reading the manual to the division” type training with relevant and engaging training.

Master Phase

The master phase will provide additional opportunities for personal and professional growth—including college, graduate, and/or professional education (again, see figure 45). These Sailors’ educational experiences will improve productivity and retention. The concept of “externship” also deserves attention and should be explored. Externships, in our conception, would give a select group of Enlisted Sailors the opportunity to work side by side with their corporate counterparts, while pursuing industry certifications.

The Master Training Specialist designation should also be credited as the superior achievement the Navy needs it to be. This program must continue to develop superior trainers and should be extended from

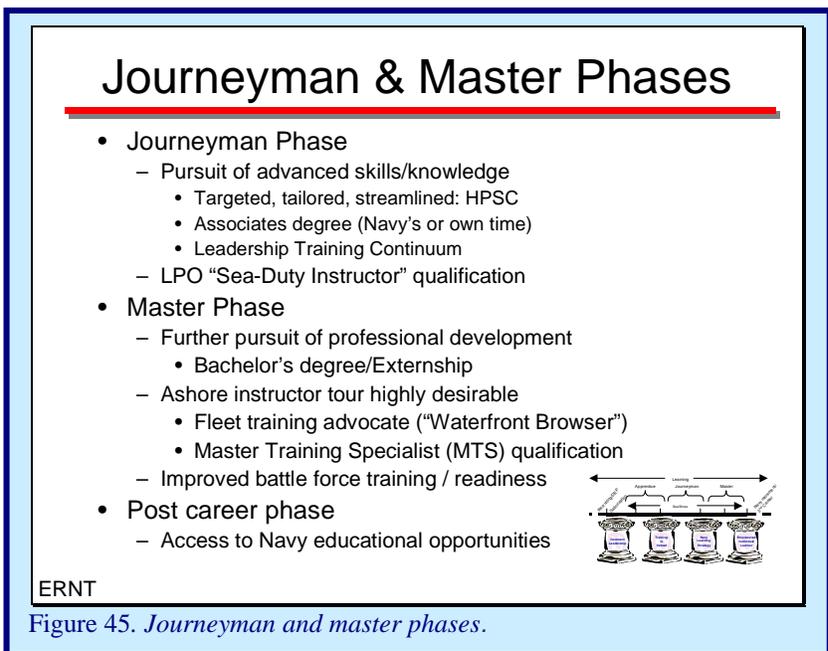


Figure 45. Journeyman and master phases.

shore to all types of duty. The program could be further enhanced by specialized training in distributed learning and could conceivably lead toward civilian teaching certification. Master Training Specialists could 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 certifications, and education degrees 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

The lifelong learning should not stop at retirement from the Navy (figure 46). The retiree would retain his or her Personal Portable Webpage and access to the Navy eLearning network. Most importantly, this

Navy Retiree Phase

- KSAs developed and honed in the Navy are directly applicable to civilian jobs
- Retirees stay current and involved in Navy life.
- Retirees remain sources of experience, potentially mentorship
- Access to Navy educational opportunities continues
- A tangible retirement benefit

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Figure 46. *Post-Navy career phase.*

transition to the civilian workplace will be enhanced by the Navy’s adoption of KSAs. This will allow Sailors to match their Navy skills with civilian jobs.

Retirees would be tied more closely to the Navy, even as they went about their post-Navy activities. Following a successful career, Sailors who are well-informed can be effective emissaries. In addition, retirees can still contribute to the body of Navy knowledge and leadership if they still have Navy learning and communications means at their disposal.

If the Revolution in Training lives up to its potential, Sailors will consider (real) lifelong access, for themselves and for family members, to be a tangible benefit of service.

V. Leading Change and Implementation

We should review what we have reported thus far. We have said that a *Revolution in Training* is required because 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 than it is today.

Implementation of this change, along with sustaining and developing a learning culture, requires selling both the new ideas and the case for change. Navy leaders will have to create the right environment and win the enthusiasm of their organizations by using every available opportunity to communicate their vision. 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 much better use of training resources and 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."

During our Review, we found 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 learners and training processes

We believe that bringing the essential components of our recommendations into being will require some fundamental shifts in the way that the Navy, and Navy people, view training and learning issues. Following a discussion of these shifts, we will address some of the cultural ramifications of the change as well as the need for a subsequent revolution in the manpower, personnel and distribution system.

We recommend some early steps—actions we believe will contribute to beginning the Revolution, illustrate the kinds of results to be expected, and help 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. That is the epilogue, the "Master Chief Kelliher" story.

The Essential Components

Here is a quick recap of our recommendations, before we move on to recommending ways of bringing about these changes (see figure 47):

The Essential Components

- Implement a Human Performance System
 - Resource CINCs to validate, certify & integrate all human performance requirements
 - Create an organization which focuses on improving Human Performance
 - Make Human Performance a KPP in acquisition
- Encourage competition (centralized process control... decentralized development) in performance solutions
- Place all training organizations under a common leader
- Establish a lifelong Sailor learning continuum

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Figure 47. *Essential components of the Revolution in Training.*

- Implement a Human Performance System that provides a process for developing solutions and enhancing performance using a systems approach. Utilize the 4-quadrant Model as the basis for this system.
- Work with the Fleet CINCs to put them (with the CNO, the Director of Naval Reactors, etc) in the driver’s seat where human performance requirements are concerned. Provide them the resources and assign them 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 intervention options, and designs and builds responses to the requirements. Require this 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 modifications to existing systems.
- Place all the organizations, people, facilities, and funds for training and support for Sailor learning in one organization.
- Embark immediately on putting in place the elements of the continuum of lifelong learning and personal and professional development for all Sailors (Officer and Enlisted).

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, 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.

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 somewhat at odds with its environment. The Navy must change again. Becoming a “Learning Organization” that covets its human capital and encourages lifelong learning and 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 that appear to us to have governed Navy’s management of its people and training.

People will be the critical resource in the upcoming decades as large corporations recognize human capital as their key resource. The new, dramatically different Navy training approach will focus on the

The Fundamental Shifts

- Navy culture must fundamentally change from “platform-centric” to “Sailor-centric”
- Navy training must be based on the science of learning
- Training “Center of Gravity” must move toward the learner, the waterfront, the flightline
- Training is only one component of the overall Human Resource management equation
- Significant organizational re-alignment may be required
- “Factors of training production” must be aligned in a single organization
- **How we change is as important as what we change**

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Figure 48. *Fundamental shifts in the Navy’s approach to training.*

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 will be rooted in the science of learning and apply it to teaching, training, and supporting the learning of Sailors (figure 48).

The Navy training system must be flexible, agile, and self-renewing. It must be responsive to its customers—Sailors and the Fleet. It must be responsive to the needs of learners and operators and allow Sailors to arrive at their ultimate duty station as quickly as possible; it must get them on the job right away and keep them on the job as much as possible.

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 system. The effectiveness and efficiency of this system must be improved by realigning Navy organizations. These organizations have evolved over time in response to platform and warfare community stimuli, and not to serve the Sailor. Also, 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 are also assessed and optimized.

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 strongly 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 (figure 49). 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 address the issues of access and time that prevent our Sailors from participating in the training they need.

Changes to Navy Culture

- Quality training is a high priority
 - Leaders accountable for developing subordinates
 - Promotion requires knowledge of teaching / learning
 - XO / #2 is the unit's / staff's Learning Officer
 - XO fleets-up to CO for continuity and training emphasis
 - CMC/COB's function as human resource manager
 - Training impact on readiness measured and tracked
- Training expertise in the fleet
 - Cadre of Sea-Duty Training Experts
 - Customer-focused training experts on the waterfront
 - Specific training support for OJT
- Pervasive Access
 - Learning available 24/7
 - Dedicated time to achieve advanced skills & education

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Figure 49. *Changes to Navy culture.*

As we said in an earlier section, 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”; second, expand the aviation process of succession to command to other communities.

What about specific support for training conducted by leaders in operating units and shore activities? We recommend three things that should appeal to leaders who subscribe already to the idea that they bear considerable responsibility for the learning and growth of their subordinates. First, the Navy should strive to develop that cadre of training experts on board its commands.

Second, the Navy should 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 issue, 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 toward 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 manifest 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 (figure 50). This profound change, which inspires us to think differently and challenges the Navy’s culture, requires a shared sense of urgency to ask and answer the questions, “Why this and why now?”

The Implementation Team will be challenged to build and 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.

Leading Change

- To achieve desired results the Navy must change the way it thinks about learning & training
- The change in culture will come last, not first & will depend on results
- Requires lots of talk & “walking the talk” ... will involve turnover or directed loss of people
- Some will resist, many will want to declare victory & quit too soon, at the first sign of success
- Maintaining momentum will be critical, or the old culture will come back like a “crashing wave”
- The road we are on is unending & will generate perpetual change as we move to a learning organization—but will be worth it!

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Figure 50. *Leading change.*

Appreciative inquiry can be a powerful tool for beginning and sustaining the change process. It is a form of action research that attempts to create new theories/ideas/images by examining best practices and avoiding examination of worst practices. In this way, future actions are based in a “what worked best”

reality vice theoretical themes built upon analysis of what didn't work well. The key to data collection in appreciative inquiry is the collection of people's stories of something at its best. For example, if improved naval leadership is our goal, we collect stories of naval leadership at its best. If enhanced training and education is our goal, we collect stories about great training and education experiences. These stories are then collectively discussed in order to create new, generative ideas or images that aid in development of improved plans of action.

The core of appreciative inquiry are the assumptions that in every organization (1) there is always something that works well, (2) what an organization focuses on, becomes its reality, (3) reality is created in the moment, from multiple perspectives, (4) the use of AI influences the group, (5) members are more comfortable with known information than the unknown, (6) language (the terminology) of an organization sets the stage for reality. With these core assumptions in place, appreciative inquiry can provide just the kind of grounded, new perspective that, in conjunction with other forms of analysis, can sustain major change efforts through the initial stages of development.

And one of the major goals in this phase is to generate more change, accelerate the transformation process, and convert more advocates, thereby getting 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 make up 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.

From our discussions with industry and review of the literature (drawing heavily on John Kotter's book *Leading Change*), we recommend a website structure that 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 (figure 51). 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*.

As always, yet as never before, the success of this revolution rests with the Chief Petty Officers of the Navy. Ensuring that they embrace the principles of covenant leadership and demonstrate the commitment to learning is paramount.

Among the topics addressed early in the Revolution should be a "Top 5"; issues 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 people who will be most important to making the change, and their specific interests, and the solution of their problems."

Implementation Team members might find it useful to form multiple, parallel-action teams. These could include, for example: a performance consultant action group; a Fleet-focused 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.

Early (Almost Immediate) Steps

- CNO establish a full-time Implementation Team
- Apply human performance process & implement “Learning Organization” in Fleet
 - Battle Group Improvement Campaign Plan (beginning with 1 ship, sub & squadron)
 - USW training
 - C4I training
 - Communications Campaign Plan
 - Acquisition Policy Campaign Plan
 - Navy Learning Strategy Team
 - Sailor Learning Continuum Team
 - SWOS Curriculum
- Implement “Quick-Hitters” to generate short-term wins
- Begin process changes
 - Develop 9000-series instruction
 - Designate #2’s the Learning Officers

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Figure 51. *Early implementation steps.*

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

- Creating and broadcasting 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 warfare 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 Webpage, computer appliances, internet service provider access, and so on for every recruit (eventually, every Sailor)
- Designating every unit’s 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 Webpages (PPWs) for crewmen.

Selecting and improving specific mission areas, and improving training and performance in key ratings, will be important to learning lessons. The Undersea Warfare (USW) mission area, for example, offers a fertile field for development: USW depends on a set of highly visible, highly perishable skills 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 rating 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 Implementation Team probably won't get everything right with CVBG #1, but what they learn can be transferred to CVBG #2, 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.

Communications

The success of this effort hinges on 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 must embrace the ERNT guiding principles. To inspire and engage the entire Navy community, the plan will have to communicate how the Revolution positively addresses the professional and personal needs and concerns of Sailors, as well as the command structure. The CNO should be engaged strategically to initiate and propel the Revolution. To maintain momentum and ingrain cultural changes, the communications effort will aggressively promote program developments through all internal Navy media outlets and selected external outlets.

Our communications and marketing goals should be to:

- Explain what the Revolution in Training is and how it will positively affect the careers of Navy people.
- Inspire and engage everyone, 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 lifelong learning.

Successfully communicating this vision to Navy and DoN 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. This would include a pre-launch promotional effort to build interest and momentum, and an official roll-out with a Navy-wide event featuring the CNO and an internal media blitz. Immediate and frequent multi-media exposure is paramount, and near-term communications measures should embrace key congressional leaders concerned with military affairs and Navy issues. A live telecast/webcast with the CNO launching the initiative would be ideal; other initiatives could include a CD-ROM that explains the program's goals and objectives, a monthly webcast (available both live and on-demand) with the CNO, MCPON, and the Training Commander updating the Fleet on initiatives under way, and special articles in professional publications such as *Sea Power* and *The Proceedings of the Naval Institute*.

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

Set Stretch Goals

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 other possible stretch goals in figure 52 by way of illustration.



Figure 52. Stretch goals.

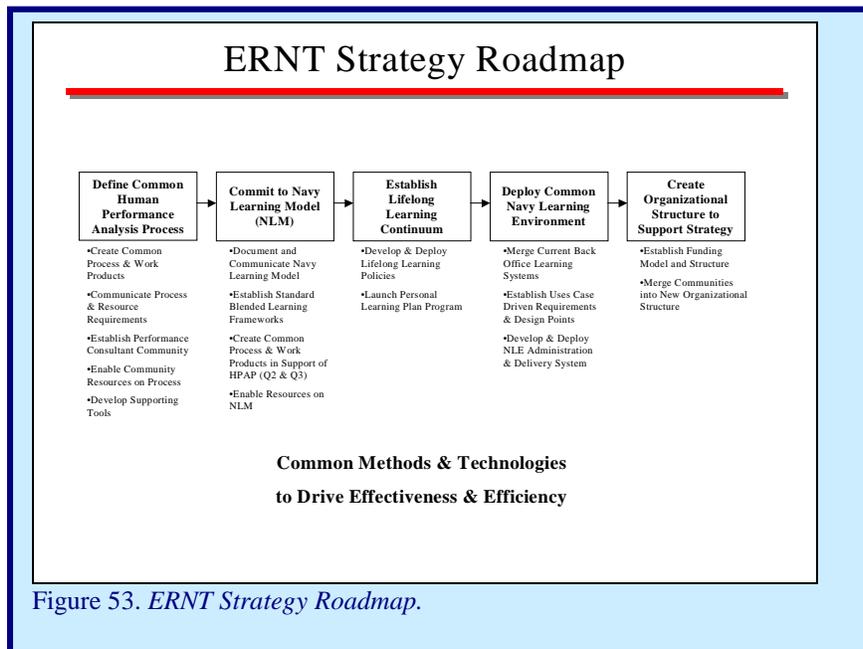


Figure 53. ERNT Strategy Roadmap.

The Revolution will never end, but the first three to five years will be crucial to its success. We offer the roadmap in figure 53 to help along the way.

VI. Summary and 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 an integral part of both 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. Although 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.

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. We examined the agile, responsive, flexible organizations that are in use elsewhere and needed desperately by the Navy. Concepts and organizations of the types we found can apply these learning advances to the right people, at the appropriate time, in the proper place, for the best effect for the Navy, too.

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 learning needs, and those of their families, be satisfied as well.

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 also 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 system with only "Islands of Excellence" into an aligned, agile, responsive learning organization.

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, influence it, and bend it to the Navy's purposes.

Recap of Recommendations

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

Processes:

- Adopt the 4-quadrant Human Performance System Process
- Base training solutions on the 5-tier Navy Learning Model

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- View civilian-to-Sailor transformation as a single process
 - Recognize the importance of a learning continuum.

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.

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.

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, and so on
- “Thousands of teachers,” a cadre of afloat training specialists.

Issues for Further Study

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 issues 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 again 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
 - Rotation and stability of crews of ships, submarines, and aircraft squadrons
- Access 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.



VII. Epilogue

It is April 2028 and ETCM (SW/AW) Mary Kelliher, Commander Second Fleet's Command Master Chief, is one of six finalists in the selection process for Master Chief Petty Officer of the Navy. She has just returned from her week of interviews with the Chief of Naval Operations and his staff. It was a wonderful experience, and she is deeply honored to have been chosen as a finalist. These thoughts, along with the cold night and a warm fire, allow Master Chief Kelliher to doze off slowly and reflect; she recalls the improbable circumstances that have brought her to this point in her career - What a Ride!!

In December 2003, a much younger Mary Kelliher had walked into Navy Recruiting Station Houston East to join the Navy. The recruiter, Petty Officer Jim Jackson, gave her a Learning Profile, Personality, and Interest Assessment. With that, he determined that Mary would be good in the electronics field, that she preferred to receive information visually, and that she processed information in a concrete-sequential manner (by the numbers). This profile information was transmitted to the Profile Assessment Branch of the Bureau of Naval Personnel (BUPERS). Based on the date Mary chose to begin Boot Camp, a set of orders was generated in a matter of minutes by the BUPERS intelligent software systems. Petty Officer Jackson was empowered to confirm orders and ship recruits using the decision aids provided by BUPERS and Commander, Navy Recruiting and Recruit Training Command. Before she left for Recruit Training, Mary's computer skills and personal financial knowledge were also assessed. A Navy eLearning Computer Based Training (CBT) regimen was prescribed to bring her up to basic Navy standards in several learning areas prior to Boot Camp. She was surprised at how Petty Officer Jackson mentored her during this process. Largely because of his interest and support, she successfully finished her CBT program and also pursued Navy Orientation via the CYBER Delayed Entry Program (DEP) site; she used both an online and CD interactive course of instruction. She earned 400+ points, which made her eligible for E-2 immediately upon completing Boot Camp. She was really excited! One week prior to shipping, Petty Officer Jackson introduced Recruit Kelliher to her Recruit Division Commander (RDC), Petty Officer Joan Cartwright, via her personal CYBER DEP webpage. This was the first of many "mentor handoffs" of Mary Kelliher's career. After an exchange of e-mails, Petty Officer Cartwright got to know Mary pretty well, and vice versa. Mary was ready to start learning!

Petty Officer Cartwright met Mary as she left the bus. Boot Camp was personal but extremely challenging and the ultimate sailorization process. Petty Officer Cartwright and the other RDCs really tested them! The graduation exercise in Battle Stations took place in a virtual reality, Universal studios-type facility; the recruits were immersed in scenarios from historic Navy battles and accidents; they were cold and wet in damage control scenarios. Mary's mettle truly was tested. The Battle Stations graduation is etched in her mind today as one of the defining moments of her life. For the first time, she had successfully completed a challenging program. Tears flowed that day long ago during a very patriotic recognition ceremony. She now was SA Kelliher! Then she remembered many things happening at once. She and her shipmates were presented with personal computing appliances—each with his or her Personal Portable WebPages (PPW). The page was already loaded with their career training plans, the beginnings of Personal Learning Plans, electronic training jackets, education roadmaps, personnel files, pay and allowances information, etc., and a personal "Welcome to the Navy" video clip from Admiral Vern Clark, the Chief of Naval Operations. Wow!! Petty Officer Cartwright conducted a mentor handoff with SA Kelliher's instructor for initial skills training, Petty Officer Bill "Red" Butler, who contacted SA Kelliher on her PPW.

She started electronics school in a self-paced course of instruction, tailored to her learning style. Her computer and reading literacy skills were continuously enhanced via intelligent tutors in her interactive courseware (ICW). By the time SA Kelliher arrived at her initial school, her basic electronics course had now become version 33, reflecting the new technology in the Fleet. Her friend Tiffany, who joined three months ago, had learned on version 32. The Human Performance System's Knowledge Factory had been able to revise and produce the latest version in less than two weeks. Using learning templates, the 21st century human performance specialists and contracted graphic artists had done great work. Her ICW helped her achieve a 100-percent mastery of the Fleet requirements for a Seaman Apprentice in electronics. The final exam in her course assessed her knowledge, skills, and abilities (KSAs) to perform certain tasks.

A communications channel was established between her school and her first Fleet command; her new work center supervisor was provided a profile of SA Kelliher. The supervisor would also be expected to send reports to her school on her performance at various intervals throughout her first tour. SA Kelliher's performance was then to be compared with that of other electronics-school graduates, allowing continuous improvement in the school's course of instruction. Her PPW was updated with information about her first ship and she took a virtual tour. Petty Officer Butler introduced SA Kelliher to her Leading Petty Officer (LPO), ET1 Mark Dougherty, via her PPW. She also received a note via her PPW from the Commanding Officer, her Division Officer, and the Command Master Chief.

Upon graduation from her initial skills course, now ETSA Kelliher earned 25 college credits for her training. She also enrolled in the Navy College Program (NCP) online with one of the designated colleges for Electronics Technicians. This would be her Partner University. ETSA Kelliher reported aboard USS BONHOMME RICHARD (BHR) and was immediately assigned to her work center where she spent her first 12 months working in her division on electronics tasks that helped cement her learning. During this first year, General Military Training (GMT) and some of her core values training were provided in a scenario-based, highly interactive CD or web-based course in which she was tested frequently on her knowledge and decision-making. This interactive course was facilitated by her LPO, ET1 Dougherty, who was a formally trained and qualified Afloat Training Specialist. ET1 Dougherty told ETSA Kelliher how lucky she was to receive this interactive training. In the old days, ET1 would have read GMT lectures to the people of her work center while they sat on the deck plates.

ETSA Kelliher's Division Officer was LTJG Sam Cunningham, a Naval Academy graduate. She remembers how impressed she was with LTJG Cunningham's demeanor and leadership skills. He had been aboard 30 months and was an energetic and enthusiastic leader. He had been selected for Department Head School. He related how he was the first of a group of Surface Warfare Officers to report aboard his ship pre-qualified and certified. LTJG Cunningham had benefited from advanced simulation and virtual-reality trainers at Surface Warfare Officers' school. He said that he had "virtually qualified" on BONHOMME RICHARD's bridge before he ever saw the ship. The Commanding Officer, of course, granted his final qualifications in all watch stations.

During ETSA Kelliher's first sea tour, her ship received three different versions of the electronic equipment for which she was responsible. She could update her skills immediately, however, using either Computer Based Training (CBT) in a reconfigurable classroom ashore, or by using the training system embedded in the equipment. Sailors who reported after ETSA Kelliher received training on these new versions prior to their arriving aboard, because the OPNAV training resource sponsor controlled all training funding and imposed discipline on the Systems Commands. The SYSCOMs were required to provide the new versions' training equipment to the schoolhouses and the Fleet concentration area reconfigurable classrooms before the first shipboard installation took place. ETSA Kelliher was promoted to ETSN.

Within 18 months of her reporting on board, USS BONHOMME RICHARD deployed. During the deployment, one of the newly installed pieces of electronic gear that ETSN Kelliher was responsible for maintaining suffered a casualty. After consulting with her LPO and reviewing the technical manuals on their shipboard Navy Virtual Library (NVL) system, neither of them could resolve the problem. NVL was an integrated shipboard server library, which provided Sailors access to information via either computers in the shipboard spaces or their personal computing appliances. A great deal of material was easily accessible. Technical, educational, training, medical, Information Technology (IT), entertainment, and resource information was all there. ETSN Kelliher and her LPO entered the NAVSEA Distant Support Portal and, via Collaboration-at-Sea (a knowledge management system), linked to a 24/7 waterfront browser support center ashore via their chat room. After a brief exchange with the browser support center, the center referred ETSN Kelliher's problem to a "server center" of industry experts linked to Navy trainers. The server center helped resolve the problem. A performance deficiency (training in this case) was also identified, since ETSN Kelliher and her LPO actually used her CBT module to troubleshoot the problem, to no avail. This deficiency was immediately fed back to the schoolhouse and curriculum control authority. They worked with the Human Performance System's consultants and made the necessary changes. These changes were not only made in the schoolhouse, but, after validation, were transmitted Navy-wide within the week to the PPW of each ET who needed the knowledge, skills, and ability codes. ETSN Kelliher quickly went online via her PPW to take the updated training via her shipboard version of NAVY eLearning. Because the LPO had access to a Learning Management System, he monitored her progress and that of each Sailor in the work center.

During the deployment, ETSN Kelliher competed for advancement to E-4. She took her (computer-based) examination 14 September. The exam not only tested her theoretical knowledge of electronics principles, but also gave her a rigorous troubleshooting regimen to deal with (performance metrics). She also responded to Navy heritage questions and leadership problem vignettes. Her advancement package was sent electronically to the Naval Education and Training Professional Development and Technology Center, and results were returned to the ship by 28 September. She was advanced. She now was a leader and was given new responsibilities, plus three Sailors to supervise. Her LPO reviewed and revised her Personal Learning Plan with her. He also set up a scenario-based, interactive leadership course on her personal webpage. Since leadership training is personal and dynamic, her LPO also facilitated this course of instruction. ET3 Kelliher also completed six semester hours online via the NCP during the deployment. Her books were uploaded onto the Navy Virtual Library server on board her ship and could be accessed only by her via her personal webpage.

She now was approaching three years time in service, and her LPO said he wanted Mary to go to an advanced electronics school. School theory was provided to Mary online via Navy eLearning courses on her webpage. One month after the ship returned to homeport, Mary remembers walking down the pier to the residential portion of her advanced school and, within two months, not only being awarded a new KSA code, but also an Associates Degree in Electronics Technology from her Partner University in the Navy College Program. The University awarded Mary college credits for all of her Navy training, and the liberal arts courses she took before and during deployment.

Within four years ET3 Kelliher had been advanced to E-5. During her first shipboard tour, she also qualified as an Enlisted Surface Warfare Specialist. The warfare qualification program was tough and challenging, especially the engineering portion. The training teams set up virtual-reality scenarios, wherein she had to literally fight to save the ship. In essence it was a super Battle Stations. The training team placed sensors in key spots throughout the ship that simulated fires, flooding, damaged equipment, broken steam lines, electrical cables, etc., for her final qualification exercise. She and the other Sailors who were being tested donned virtual-reality helmets and were graded, not only on their individual knowledge and skills, but also on their ability to work as a team. She excelled—she was now ET2

(Surface Warfare) Kelliher. One CPO noted that this new training was a lot better than “Mr. Fire” and “Mr. Smoke,” the red and black flags that were the extent of the training devices available in the past.

She was now right on track with her Career Training Plan (CTP) that she and her LPO had worked out and posted on her personal webpage when she reported to BHR. This plan was, for her, a roadmap all the way to Master Chief. However, she now found herself at a career crossroads because her fiancé wanted to get married and was ambivalent about being a Navy spouse. She went home on Hometown Area Recruiting Program (HARP) duty to make career and life decisions. During her two weeks of HARP duty, she began to notice that her almost five years in the Navy had changed her. In comparison with her classmates, she was more worldly and urbane. While her classmates talked about the latest bazaar, old boyfriends, and rehashed high school stories, ET2 (SW) Kelliher talked about Hong Kong, Singapore, her leadership challenges, and the great Navy training and education from which she was benefiting. She also noticed that her values had changed. She was convinced—she would stay Navy. Now the hard part: convince Tom. She shared her Career Training Plan and Personal Learning Plan with him and was honest with him that the Navy was a challenging, rewarding career for her. She told him that life would be a journey and there would be no better place to be in the first half of that journey than the United States Navy. Tom finally agreed. Plus, he was excited because he was interested in Information Technology (IT) and, as a spouse, would also be able to take courses free via Navy eLearning. He could see that professional certification was in his future as a Navy spouse.

Back on board, ET2 (SW) Kelliher looked at the BUPERS link on her PPW and saw that, in 18 months, just about the time of her planned rotation, a billet for an ET1 (SW) in Rota Spain would be available. She had always wanted to have an assignment in Rota so that she and Tom could travel in Europe. However, the billet would require her to have KSA 3344, which she then did not possess. She searched the courses offered on Navy eLearning and determined that she could earn KSA 3344 online, and the average time to complete the course was about 4 months. She immediately applied through her PPW for both this billet and for the KSA courses. Her next hurdle would be to make E-6; she was up for E-6 in 6 months and made it. Although she had her Associates Degree, she wanted to enhance her training and education portfolio, and her chances for landing the Rota billet. So she enrolled in two courses—Spanish, and Intercultural Relations. She completed both these courses with her Partner University via the Navy College Program (NCP). Immediately upon finishing these courses, she saw that her training and education portfolio was updated, and the detailer had automatically been notified. The detailer looked at her portfolio and compared it to the four other Sailors bidding for the same billet. He selected ET1 (SW) Kelliher for the job, based on the strong endorsement from her chain of command and the breadth and depth of the portfolio she had worked hard to build.

After Rota, ET1 (SW) Kelliher needed a training tour to round out her career and make her competitive for E-7. She bid for ET school in Great Lakes. During this tour, she became a Master Training Specialist (MTS). She also ran into now LCDR Cunningham, her first Division Officer. He was in a highly coveted training tour at Great Lakes. He told her he had completed his Masters Degree and was selected early for Commander. He was then en route to his new assignment as Executive Officer (he would fleet-up to Commanding Officer (CO)) tour aboard USS WINSTON CHURCHILL. He said he was concerned about this new fleet-up career progression in the Surface Warfare community, but admitted that from a warfighting perspective it made sense, since he would relieve the current CO in the middle of deployment in the Middle East in approximately 18 months.

ET1 (SW) Kelliher asked for a split tour to the afloat training segment of the Integrated Training Organization; she used that opportunity to become a formally trained Afloat Training Specialist (ATS). As an ATS, she learned how to employ training tools, the science of learning, and various learning models to train Sailors and teams aboard ships in the full gamut of learning, from tailored individual training programs to complex shipboard warfighting and damage control scenarios. During this tour, she

earned her khaki (was selected for Chief Petty Officer) and eventually completed her Bachelor's degree. Her Master Chief told ETC (select) (SW) Kelliher that she was a hot runner because she was well ahead of her contemporaries on her Career Training Plan and in her Personal Learning Plan. Her next assignment was as a leading Chief Petty Officer aboard USS GEORGE WASHINGTON. Aboard GW, she qualified as an Enlisted Aviation Warfare Specialist and made E-8. Her CO recommended her for the E-8 Academy, which was taught for five months online with other E-8s, followed by a two-week residency program in a fleet concentration area. After three years aboard GEORGE WASHINGTON, ETCS (SW/AW) Kelliher was offered the dream of a lifetime—an opportunity to earn her Master's degree in electronics with an IT subspecialty at Naval Postgraduate School (NPS) in Monterey. Following NPS, ETCS (SW/AW) Kelliher was offered an “externship” at a Silicon Valley company for one year to further hone her subspecialty skills. Her husband Tom was also excited, since he had become an IT specialist and would do well to spend a year in Silicon Valley. All of those Navy eLearning certification courses had really enhanced his career also. Mary recalls now how her “employability” had been enhanced by the Navy’s investment in her learning, and how she felt especially loyal to the Navy for having the confidence in her to give her these opportunities.

Back to sea, and ETCM (SW/AW) Kelliher.

She recalls now her first tour as a Master Chief and how proud her husband and parents were to learn that she had been chosen for the Command Master Chief (CMC) program. She remembers her first leadership challenges as a CMC aboard USS MASON (DDG 87). She recalls that she was well prepared for these challenges (an on-line course called “Situational Leadership” had really helped). She had two excellent CMC tours before reporting to Second Fleet. As her dream takes her through the challenges and rewards of those tours . . . the phone rings. It's Washington.



Appendix A: Glossary of Terms

‘A’ School: Follow-on to RTC, ‘A’ schools provide initial skills training for a specific rating.

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

‘C’ School: Higher-level rating and type-specific school. Fed by ‘A’ school graduates and Fleet-experienced Sailors, often requiring NEC qualification.

Chief Learning Officer: The designated and accountable officer charged with ensuring that the central tenets of a learning organization are applied throughout a command or unit.

Collaboration at Sea: An information network distributing 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. Also, a tool for on-line learning by recruits.

Cybrarian: Manages the educational cyber-space, 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, 24 hours per day.

eLearning: 24/7 access for Sailors to course-work, 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.

Knowledge Management: Process of building and managing a base of information, advice and know-how. Includes applying quality control to the knowledge base.

Learning Continuum: An integrative approach to Sailor career and personal development that 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/subordinate personnel or peers and offer advice and assistance on career development and personal growth matters.

Meta Process: Overarching strategic process that serves as a guide to other included processes.

Thousands of Teachers: Developing a culture where all leaders consider themselves to be teachers, and the Navy invests in training thousands of Sailors to teach in their normal assignments to operational units, in the Fleet and ashore.

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 develop and test the 4-quadrant model with real-world scenarios.

Appendix B: Acronyms and Abbreviations

AC: Active Component	C4I: Command, Control, Communications, Computers, and Intelligence
ACAT: Acquisition Category	C4ISR: Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
ACTC: Air Combat Training Continuum	DL: Distance Learning
ADL: Advance Distributed Learning	DEP: Delayed Entry Program
AEC: Automated Electronic Classroom	DSB: Defense Science Board
AFQT: Armed Forces Qualification Test	DoN: Department of the Navy
AVF: All-Volunteer Force	DT/OT: Development Testing/Operational Testing
ARG: Amphibious Ready Group	EPSS: Electronic Performance Support System
ASN (RDA): Assistant Secretary of the Navy (Research, Development and Acquisition)	ERNT: Executive Review of Navy Training
ASW (USW): Anti-Submarine Warfare (Undersea Warfare)	FCA: Fleet Concentration Area
ASTD: American Society for Training and Development	FCTCPAC: Fleet Combat Training Center Pacific
ATRC: Aegis Training and Readiness Center	FYDP: Future-Years Defense Plan
AT/FP: anti-terrorism/force protection	GCCS: Global Command and Control System
BG: Battle Group	GMT: General Military Training
CBT: Computer-Based Training	HPSM: Human Performance Systems Model
CEB: CNO Executive Board	HSI: Human Systems Integration
CINC: Commander in Chief	IA: Individuals Account
CEO: Chief Executive Officer	IETM: Interactive Electronic Technical Manual
CIC: Combat Information Center	IDTC: Inter-Deployment Training Cycle
CLO: Chief Learning Officer	IMAT: Interactive Multi-Sensor Analysis Trainer
CMC: Command Master Chief	IPT: Integrated Process Team
CNA: Center for Naval Analyses	ISIC: Immediate Superior in the Chain of Command
CNET: Chief of Naval Education and Training	IST: Initial Skills Training
CNO: Chief of Naval Operations	IT: Information Technology
CNP: Chief of Naval Personnel	I/ITSEC: Interservice/Industry Training, Simulation and Education Conference
CNRC: Commander Navy Recruiting Command	JMETL: Joint Mission Essential Task List
CO: Commanding Officer	JROTC: Junior Reserve Officer Training Corps
COTS/NDI: Commercial Off-the-Shelf/Non-Development Items	JO: Junior Officer
CPO: Chief Petty Officer	JPA: Job Performance Aides
CVBG: Carrier Battle Group	KSAT: Knowledge, Skills, Abilities, & Tools
C1: Fully Mission Capable	KPP: Key Performance Perimeter
C3F: Commander Third Fleet	LOS: Length of Service

LPO: Leading Petty Officer
LTA: Local Training Authority
MCPON: Master Chief 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
OCCSTANDARDS: Occupational Standards
OJT: On-the-Job Training
OPN: Other Procurement, Navy
OPNAV: Office of the Chief of Naval
Operations
OPTAR: Operational Target (funds)

OPTEVFOR: Operational Test and Evaluation
Force
ORD: Operational Requirements Document
PM: Program Manager
PPP: Personal Portable Page
PPW: Personal Portable Webpage
PQI: Personnel Quality Index
RC: Reserve Component
RDC: Recruit Division Commander
R&D: research and development
ROC/POE: required operational
capability/projected operating 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: Temporary Additional Duties
TYCOM: Type Commander
UI: Under Instruction
VCNO: Vice Chief of Naval Operations
VolEd: Voluntary Education
VR: Land-based logistics air transport
XO: Executive Officer
6YO: Six-year Obligor

Appendix C: References and Resources

Articles

- Barrett, Frank. "Creating Appreciative Learning Cultures." American Management Association, 1995.
- Cooperrider, David. "Positive Image, Positive Action: The Affirmative Basis of Organizing." *Appreciative Management and Leadership*.
- Ewen, Ann and Linda deLeon. "Multi-source performance appraisals." Winter 1997.
- Jerome, Marty. "Top 10 Wireless Internet Lies." Smartbusinessmag.com
- Whitney, Diana; Cooperrider, David L; Garrison, Maureen E.; Moore Jean P. "Appreciative Inquiry and Cultural Change at GTE: Launching a Positive Revolution."

Books

- Chawla, S. and J. Renesch (1995). *Learning Organizations*. Portland: Productivity Press.
- Lohan, Kevin and Alastair Rylatt (1997). *Creating Training Miracles*. San Francisco: Pfeiffer.
- Kanter, R.M., B.A.,Stein, and T.D Jick (1992). *The Challenge of Organizational Change*. New York: Macmillan.
- Kotter, J.P. (1996). *Leading Change*. Boston, MA: Harvard Business School Press.
- Kotter, J.P. (1999). *What Leaders Really Do*. Boston, MA: Harvard Business School.
- Marquardt, M. (1996). *Building the Learning Organization*. Washington, DC: McGraw-Hill.
- McGill, Michael and John Slocum (1994). *The Smarter Organization: How to Build a Business That Learns and Adapts to Marketplace Needs*. New York: John Wiley & Sons.
- Nadler, D.A. (1998). *Champions of Change: How CEOs and Their Companies are Mastering the Skills of Radical Change*. San Francisco, CA: Jossey-Bass.
- Probst, G. and B. Buchel (1997). *Organizational Learning: The Competitive Advantage of the Future*. London, UK: Prentice Hall.
- Quinn, R.E. (1996). *Deep Change: Discovering the Leader Within*. San Francisco, CA: Jossey-Bass.
- Senge, Peter. (1990) *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday-Currency.
- Reason, Paul. (1998) *Sailing New Seas*. Newport Papers. Number 13.
- Schwandt, D.R. and M. Marquardt (2000). *Organizational Learning: From World-Class Theories to Global Best Practices*. Boca Raton, FL: St. Lucie Press.
- Sisakhti, Reza (1998). *Effective Learning Environments: Creating a Successful Strategy for Your Organization*. Alexandria, VA: ASTD.
- Vaill, P.B. (1991). *Managing as a performing art*. San Francisco: Jossey-Bass.

Briefings

- Center for Career Development. "Our People Problem: Brief to NHRBOD." CAPT Jake Ross.
- Center for Naval Analyses. "Defining Work With Fidelity Implementing Skill Objects: A Pilot Program." Dr. Federico Garcia.
- Center for Naval Analyses. "Navy Enlisted Education Policy," and "War for Talent." Dr. Peggy Golfin.
- Chief of Naval Education and Training. "Chief of Naval Education Is and Should Be..." and "Other Service Training Organizations." RADM David Brewer, Mr. Terry Halverson

Circuit City. "E-Learning: The New Pathway to Sales Force Development and Success." Jeffrey Wells, Senior Vice President, Human Resources.

Cisco Systems. "Cisco's E-Learning Blueprint." Rick Crowley. Senior Manager, Cisco E-Learning Architecture.

Cisco Systems. "E-Learning." Tom Kelley. Vice President, Internet Learning Solutions.

Empire BlueCross BlueShield. "Enabling Large System Change." Kenny Klepper et al.

FTC San Diego. "FTC San Diego: Preparing Sailors to Succeed." CAPT Alex Watt.

Naval Air Systems Team. "Risk Management." CAPT Rory Fisher.

Naval Air Warfare Center Training Systems Division. "Setting the Record Straight: Training Myths and Misconceptions." Dr. Janis Cannon-Bowers.

Naval Air Warfare Center Training Systems Division. "Training Measurement & Metrics." Dr. Jan Cannon-Bowers.

Naval Aviation Systems Team. "The Balanced Scorecard." CAPT Rory Fisher.

Naval Personnel Research, Science and Technology. "Sailor 21." Mr. Murray Rowe.

Naval Postgraduate School. "Strategic Human Resource Development" Carson Eoyang.

Naval Postgraduate School. "The Naval Postgraduate School: A View to the Future." RADM David Ellison.

Naval Postgraduate School. "30-Something Group/Appreciative Inquiry." LCDR Dave Nystrom.

"Navy Instructor and Teacher BOT." Jeffrey M. Seligson.

Navy Supply School. "Business Education for Navy's Decision Makers." CAPT Dave Ruff.

Ninth House Network. "Building a Powerful Workforce Through eLearning." Tony Mitchell et al.

Office of Naval Research. "Human Systems S&T Department." CAPT Timothy Singer and Dr. Hal Guard.

Old Dominion University. "Distance Learning Initiatives." CAPT (Ret.) Dick Whalen.

OPNAV N6K4. "Navy Marine Corps Intranet." CDR Steve Mackie.

OPNAV N779. "Training Organizational History" Mr. George Horn.

OPNAV N791. "Flow of Training Funds." John McCloud.

OPNAV N81. "Training and Education IWAR," and "Potential VCNO Task Force Relationships" CDR Matt Peters.

Task Force Whiskey. "Task Force Whiskey." CAPT Mareen Copeloff.

"Tech Solutions Overview." CDR Mike Sonnefeld.

Reports

Bassi, Laurie et al. *Profiting From Learning: Do Firms' Investments in Education and Training Pay Off?* ASTD. September 2000.

Bassi, Laurie and Mark Van Buren. *Measuring What Matters: Core Measures of Intellectual Capital.* ASTD. July 2000.

Braddock, Joe, and Ralph Chatham. *Training Superiority and Training Surprise.* Defense Science Board. January 2001.

Cannon-Bowers, Janis and Eduardo Salas. *The Anatomy of Team Training.*

Cannon-Bowers, Janis et al. *Conditions of Practice: Optimizing Learning and Performance.*

Cannon-Bowers, Janis et al. *Do Computer-Based Games Facilitate Knowledge Acquisition and Retention?*”

Cannon-Bowers, Janis and Eduardo Salas. *A Framework for Developing Team Performance Measures in Training*.

Cannon-Bowers, Janis and Eduardo Salas. *The Science of Training: A Decade of Progress*.

Cannon-Bowers, Janis and Eduardo Salas. *Team Performance and Training in Complex Environments: Recent Findings From Applied Research*.

Cheney, Scott. *The State of Ourselves: A Supplemental ASTD 2000 State of the Industry Report on Internal Training Departments*. ASTD 2000.

Chief of Naval Operations Strategic Studies Group XVI. *Naval Warfare Innovation Concept Team Reports*. June 1997.

Chief of Naval Operations Strategic Studies Group XVIII. *Sea Strike: Attacking Land Targets from the Sea*. September 1999.

Chief of Naval Operations Strategic Studies Group XIX. *Naval Power Forward*. September 2000.

Cothrel, Joseph and Ruth L. Williams. *Building tomorrow’s leaders today*. September/October 1997.

Filipczak Bob. “Critical mass: Putting whole-systems thinking into practice.” September 1995.

Filipczak, Bob. “The triple 7.” September 1995.

Joint Professional Military Education in 2010: The EdTech Report. Joint Staff Publication. October 1998.

Marquardt, Michael. *16 Steps to Becoming a Learning Organization*. ASTD. Issue 9602.

McGraw, Karen. *How to Develop a Comprehensive E-Learning Strategy: First, Think Infrastructure!* Saba White Paper.

Military Manpower Training Report. June 2001.

Murrell, Kenneth. *Organizational Culture*. ASTD. Issue 9303.

Newman, Amy. *Knowledge Management*. ASTD. March 1999. Issue 9903.

Raybould, Barry. *EPSS and Your Organization*. ASTD. June 1998.

Russell, Susan. *Create Effective Job Aids*. ASTD. November 1997.

Woodwell, William and Mark Van Buren. *The 2000 ASTD Trends Report: Staying Ahead of the Winds of Change*. ASTD. December 2000.

Van Buren, Mark. *State of the Industry: Report 2001*. ASTD. February 2001.

Zero-Based Training and Education Review. ZBT&ER Final Report. November 1993.



Appendix D: ERNT Member Biographies and Executive Oversight Board

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 a graduate of the National War College.

Dr. Allen Zeman – Director of Navy 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 and Deputy Director Naval Reserve. 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.

ERNT Members	
VADM(Ret) Lee Gunn	Dr. Jan Cannon-Bowers
Dr. Allen Zeman	CAPT Skip Armbruster
RADM Dave Brewer	Mr. George Horn
RADM Noel Preston	Mr. Terry Halvorsen
RADM John Harvey	Dr Peggy Golfin
Dr. Lew Cabe	CAPT(Sel) Darlene Wood-Harvey
Mr. James Sharpe	CAPT(Sel) Matt Peters
Mr. Tony Mitchell	Mr. Steve Belcher
CAPT(Ret) Dick Whalen	LT Sean Kelliher
CAPT Rory Fisher	LT Andrea Lloyd
CAPT Alex Watt	CNOMC(AW/SW) Jonathan Thompson
CAPT George Dom	BMCM(SW) Gregory Pratt

ERNT

Figure D-1: *Members of the Working Group.*

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 eLearning Technologies Competency Segment, and Second-Line Systems Integration and Worldwide Asset Development. 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. 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. MS, 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. MS Degree in Anti-Submarine Warfare Systems Technology at the Naval Postgraduate 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 included 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. BS 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. PhD 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. MS 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. PhD 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. MBA 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. MS 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). MS 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. MA 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. 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. Also an instructor at the ABH School and an “A” School course supervisor. BS 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 9-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 (figure D-2) members:

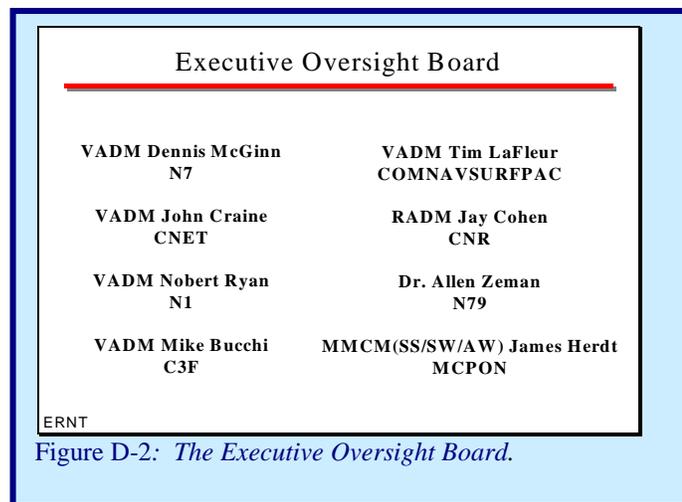


Figure D-2: *The Executive Oversight Board.*

- 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)
- VADM Tim LaFleur, Commander Naval Surface Force, Pacific (COMNAVSURFPAC)
- RADM Jay Cohen, Chief of Naval Research (CNR)
- Dr. Allen Zeman, Director of Navy Training and Education (N79).
- MMCM(SS/SW/AW) James Herdt, Master Chief Petty Officer of the Navy (MCPON).

APPENDIX E: ERNT Industry and Military Site Visits Lessons Learned

IBM – 360,000 employees

- Values intellectual capital. Top leaders have personally committed to learning, using:
 - Live video training
 - Knowledge nuggets
 - Internal web-based training network featuring Personal Portable webpages, lectures, courses, collaborative and distributive learning
 - Web-based training (WBT)
 - Classroom training
 - Self-study workbooks, audio/video training
 - Videotape w/ workbook
 - 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 eLearning. Converting quickly
- “Brick and Mortar” training still important. Despite eLearning focus, over 50 percent 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. Behaviorist, learner-centric approach. Come up with analytically derived solutions to real problems. What is the creative part: develop options in HP.
- 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 adjusting the organization to exploit.

Ford Motor Company – 319,000 employees

- A change-savvy organization
 - Survived World War I, World War II, Depression, the 1960s –70s and 80s, and the Information Age.
 - “Success is the only way to change the culture.”
- Centralized, profit-based training organization that 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 eLearning (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 for distant support. When a salesperson has to be called back to corporate headquarters, it costs \$12,000.
- Chunked learning modules (10-12 minutes).
- Personal, portable, webpage 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 go to local industry
 - Forces competitive marketplace dynamics.
- Majority of ISD, curriculum development, and instructors are outsourced.

Oracle

- Marshals all web tools to support employee learning
- Sees 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; *The* high end, on demand, desktop, interactive training medium and material.
- 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 its product. Centralizes, fields, and personalizes them for individual needs. Tailored, scalable training.
- Uses the power of story telling (*Fools Gold*). Immersion. Supervisor knows what is being done.

-
- High-quality Hollywood scripting and filming gives real-time feedback.

Circuit City

- Adopted eLearning to “survive.” Employee training to support rapid product introduction could not be met via traditional centralized classroom instruction (more products introduced in past 2-3 years than in the past 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 eLearning attendance to learning curve
- eLearning provided as “chunked learning” opportunities that can be easily completed during the standard workday.
- eLearning 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 eLearning to save money, but recouped initial investment in four months.
 - Outsourced eLearning 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 company is going
 - Change is “on track”
- Detailed plan of action and reporting system. Senior management meetings are broadcast for everyone to see.
- eLearning part of change, but overall culture changed as well
 - Moved past eLearning 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, many well researched

Naval Postgraduate School Center for 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 its 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 can be used for dead-reckoning feedback. The effective analysis of your measurement data is just as important as the type of data your company's measurement system requests.
- Organizational learning vs implementation. The first time actions do not meet words, expect 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 eLearning. CoLab rule of thumb: eLearning 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 eLearning 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, it must first develop a process by which it can turn critical information into a shared knowledge and value base. We delineate 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 this 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

We developed a human performance analysis process around a four-quadrant model. 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 this: “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 to meet the human performance requirement. It forms the basis for determining learning objectives.

Using our example above, the requirement to shoot a missile in 30 seconds might involve “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 possible to consider a range of solutions that might address the requirement. Such options include: classroom instruction; eLearning, 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 eLearning course to impart console knowledge, an embedded training system to provide practice in multifunction interfaces, and a selection test to choose operators who 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. 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.

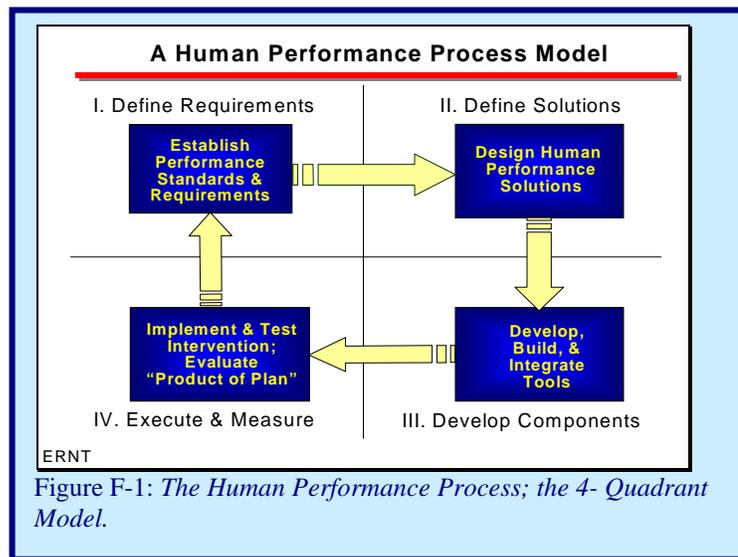
The recommendations (solution options) generated in quadrant II are then passed to quadrant III for development. A number of processes and organizations may exist to build interventions since they can be quite varied in character. Using the previous example, the intervention to achieve “knowledge of console operations” or “skill in operating multifunctional interfaces” could be traditional classroom instruction; eLearning courseware; 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 we adopted, a combination or blended solution might be optimal. For example, the particular human performance requirement “knowledge of console operations” might be met effectively by combining a short (traditional) class with an eLearning course and a job performance aid. This also allows an overarching integration and coordination function to 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 4-Quadrant Model

On the preceding pages, we presented an overview of the human performance process. On the next several pages, we further define each step of this process represented by our 4-quadrant model (figure F-1) and elaborate on the functions that must be performed to create a performance-enhancing system. We 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. The results of this functional decomposition for each quadrant are listed in a table under each section.

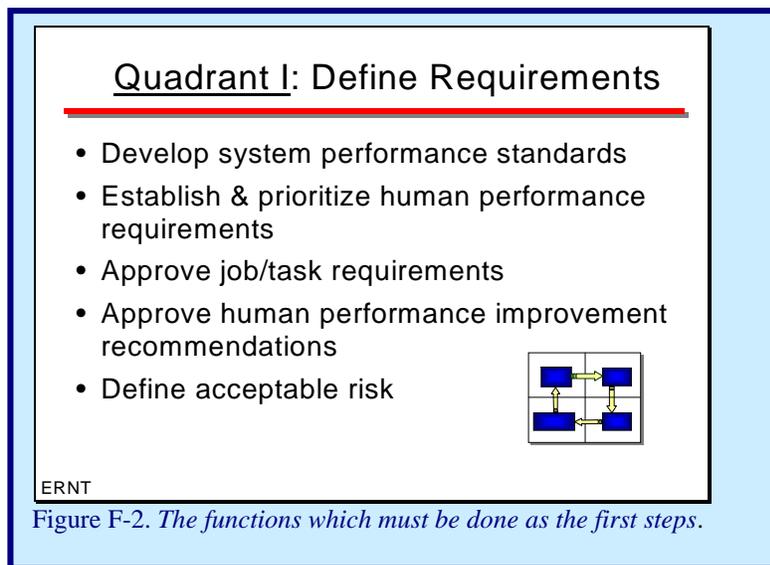


For purposes of clarity in this study, we define the functions of a quadrant as the actions that must be taken to perform designated tasks within that quadrant of the process. By describing the functions in this way, we can establish the necessary behaviors to accomplish this function. The factors that 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 provide 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 functions and interacts 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 I, is to define human performance requirements. (See figure F-2.) 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 or 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, we can incorporate a mechanism for continuous improvement based on evaluation and feedback.



The table below displays the results of the functional decomposition process for quadrant I: Define Requirements.

Functions	<ul style="list-style-type: none"> • Establish human performance requirements • Develop job performance standards • Conduct job task analyses
Triggers	<ul style="list-style-type: none"> • New systems • Performance problems • Tactics change • Safety issue • New technology
Output	<ul style="list-style-type: none"> • Job performance requirements (stated as tasks)
Metrics	<ul style="list-style-type: none"> • Acceptable mission accomplishments
Controls and Incentives	<ul style="list-style-type: none"> • Policies, processes • Resources
Required Roles and Responsibilities	<ul style="list-style-type: none"> • Validation function • Prioritization function • Resource function • Evaluation and decision on options

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. Although 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. (See figure F-3.)

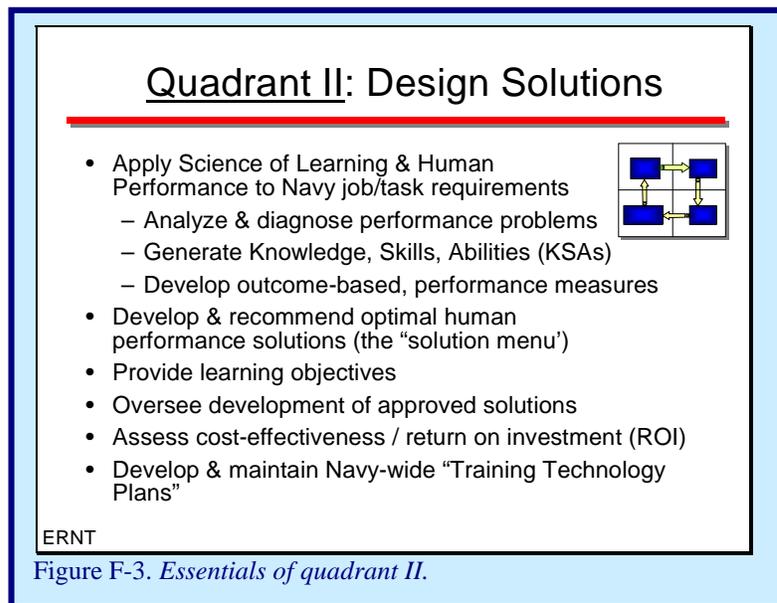


Figure F-3. *Essentials of quadrant II.*

The table below displays the results of the functional decomposition process for quadrant II: Design Solutions.

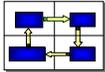
Functions	<ul style="list-style-type: none"> • Analyze performance problems • Apply science of learning & human performance • Diagnose performance problems • Generate KSAs for task lists • Provide learning objectives • Develop alternate solutions (the “menu”) • Recommend solutions • Develop performance measures/MOEs/MOPs • Create human performance analysis procedures • Maintain internal workforce
Triggers	<ul style="list-style-type: none"> • Quad I inputs (approved requirements) • Quad III inputs/lessons
Output	<ul style="list-style-type: none"> • Job performance enhancement solutions • Cost analyses for solutions
Metrics	<ul style="list-style-type: none"> • Job performance enhancement solutions • Cost analyses for solutions
Controls and Incentives	<ul style="list-style-type: none"> • “9000” series (acquisition) instruction and procedures • DoD 5000 instructions • Human performance-related key performance parameters (KPPs)
Required Roles and Responsibilities	<ul style="list-style-type: none"> • Human performance analysis function • Cost estimation function • Measurement function

Quadrant III: Develop, Build & Integrate Tools

Figure F-4 and the table below display the results of the functional decomposition process for quadrant III—Build Interventions. This is perhaps the most vital, dynamic and innovative 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 guided by the Navy Learning Model and driven by the competitive marketplace.

Quadrant III: Develop, Build, & Integrate Tools

- Develop and/or procure solutions
 - Manpower adjustments
 - Curriculum / courseware
 - eLearning applications
 - Training devices/simulators
 - Knowledge bases
 - Live training
 - Onboard/embedded training
 - OJT modules
 - Other
- Coordinate & integrate development process
- Leverage existing solutions



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Figure F-4. In quadrant III the solutions are built.

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 players 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.

The table below displays the results of the functional decomposition process for quadrant III: Develop, Build & Integrate Tools.

Functions	<ul style="list-style-type: none"> • Build solutions in accordance with Quad II recommendations • Develop or procure curriculum/courseware • Develop or procure e-learning materials • Refine learning objectives • Develop or procure training devices/simulators • Develop or procure knowledge bases • Develop or procure live training • Develop or procure on-board training/performance support • Develop on-the-job training support materials • Coordinate/integrate development processes • Leverage existing solutions (industry, Navy, academia) • Apply metrics iteratively during development
Triggers	<ul style="list-style-type: none"> • Approved Quad II recommendations, with resources
Output	<ul style="list-style-type: none"> • Human performance interventions for fielding • Data to evaluate effectiveness of interventions
Metrics	<ul style="list-style-type: none"> • Formative evaluation measures
Controls Incentives	<ul style="list-style-type: none"> • Effectiveness of intervention must be proven prior to implementation
Required Roles and Responsibilities	<ul style="list-style-type: none"> • Development function • Measurement function

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 that 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 occur. We first discuss execution functions, followed by evaluation functions.

Training solutions that are chosen in quadrant II and built in quadrant III are executed in quadrant IV. (See figure F-5.) Depending on the solution sets that are approved, several organizations may be involved to execute short-term and long-term interventions. Organizations can leverage best practices and become

virtual warehouses of information. This allows for coordination and maintenance of training infrastructure and provides an opportunity to capitalize on the Navy’s “Islands of Excellence.” In addition, facilities that execute training can focus on developing and providing instructor training.

Quadrant IV: Execute & Measure Effectiveness

- Take actions to improve human performance
- Coordinate & maintain training components & infrastructure
- Conduct periodic reviews
- Provide feedback to Quads I, II & III
- Recommend improvements
- Assess cost-effectiveness/Return on Investment
- Simplify & clarify authority, responsibility & accountability
- Evaluate risk
- Collect performance/results data
- Evaluate & measure operational effectiveness



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Figure F-5. In quadrant IV the interventions happen, the solutions are administered, and results measured.

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

Functions	<ul style="list-style-type: none"> • Conduct human performance enhancing intervention • Integrate/coordinate training components • Maintain/manage training infrastructure • Conduct periodic review of executions • Provide continuous human performance support to the Fleet (help desk) • Develop/provide instructor training • Track Fleet performance problems for action by Quad II
Triggers	<ul style="list-style-type: none"> • Quad III products ready for implementation • Quad II recommendations
Output	<ul style="list-style-type: none"> • Human performance intervention
Metrics	<ul style="list-style-type: none"> • Readiness
Controls and Incentives	<ul style="list-style-type: none"> • Evaluation of products by CINC
Required Roles and Responsibilities	<ul style="list-style-type: none"> • Development function • Procurement function • Evaluation function • Integration/coordination function • Training delivery function • Browser function (the “front office” of training)

The evaluation function of quadrant IV begins with the training experience and gives trainers immediate level 1 and 2 feedback on the quality of the training and identifies existing barriers to training implementation. In addition, level 3 and 4 feedback provides data on the effectiveness of the intervention on individual and team competencies. Feedback gathered at the unit and group level will assist the CINCs, performance consultants, and training executors in assessing whether the original objectives were

met and links this data to the actual improvement in performance. This information is then fed back into quadrant I to refine performance requirements and quadrant II for evaluating the intervention strategies.

The table below displays the results of the functional decomposition process for quadrant IV: Measure Effectiveness

Functions	<ul style="list-style-type: none"> • Link implemented solution to job performance requirements • Evaluate/measure effectiveness of intervention • Conduct periodic reviews • Collect performance/results data • Diagnose problems with interventions • Provide feedback to Quad I, II, & III • Recommend improvements • Assess cost effectiveness/ Return on Investment • Evaluate risk
Triggers	<ul style="list-style-type: none"> • Continuous • Conduct of, or completion of interventions
Output	<ul style="list-style-type: none"> • Evaluation of data • Effectiveness reports
Metrics	<ul style="list-style-type: none"> • Readiness
Controls and Incentives	<ul style="list-style-type: none"> • Independent assessment conducted by CINC
Required Roles and Responsibilities	<ul style="list-style-type: none"> • Evaluation function • Feedback function

To illustrate the differences of this 4-quadrant model approach compared to the current process, we start with the following statement: “Establish proficiency on Anti-Submarine Warfare Signal Recognition.”

	Current Process	Revised Process
Quad I	<ul style="list-style-type: none"> • Establish a course on signal recognition/ analysis 	<ul style="list-style-type: none"> • Identify a deficiency in target classification • Validate requirement against task and job
Quad II	<ul style="list-style-type: none"> •FLTASWTRACENPAC tasked to develop a signal recognition course 	<ul style="list-style-type: none"> • Perform training system requirements analysis • Identify training system requirements/criticality • Evaluate strategies and delivery • Generate solution and intervention options • Develop metrics
Quad III	<ul style="list-style-type: none"> •FLTASWTRACENPAC establishes course 	<ul style="list-style-type: none"> • Provide eLearning (DL, Video, CD's, VTT) • Provide stimulating/tapes for onboard training
Quad IV	<ul style="list-style-type: none"> •Course is delivered 	<ul style="list-style-type: none"> • Measure performance using developed metrics • Provide feedback to Quad I and II

Under the existing process, the solution is to immediately assume that a training course is needed without assessing all of the factors involved in having ASW proficiency. Notice there are no mechanisms in place in the current process with which to analyze performance data. As the above table shows, the 4-quadrant process allows for a more integrated and comprehensive approach to planning, executing, and evaluating Navy training based on performance requirements instead of predetermined training needs.

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

Functions	<ul style="list-style-type: none"> • Link implemented solution to job performance requirements • Evaluate/measure effectiveness of intervention • Conduct periodic reviews • Collect performance/results data • Diagnose problems with interventions • Provide feedback to Quad I, II, & III • Recommend improvements • Assess cost effectiveness/Return on Investment • Evaluate risk
Triggers	<ul style="list-style-type: none"> • Continuous mission readiness assessments • Conduct of, or completion of, interventions
Output	<ul style="list-style-type: none"> • Evaluation data • Effectiveness reports
Metrics	<ul style="list-style-type: none"> • Readiness
Controls & Incentives	<ul style="list-style-type: none"> • Independent assessment conducted by CINC
Required Roles & Responsibilities	<ul style="list-style-type: none"> • Evaluation function • Feedback function

Functional Analysis Recommendations

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. The Use Cases we chose 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

Functional Analysis Recommendations

- Implement Human Performance System (4-Q model)
- Resource CINC’s to validate, certify & integrate all human performance requirements
- Create a Human Performance System Organization (HPSO)
- Exploit “the Marketplace” (Centralized process... Decentralized development)

Employ Use Cases to Evaluate Organization Implications

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Figure F-6. The four recommendations centered on the 4-quadrant model.

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 in figure F-6 would yield a process that would embody those characteristics we set about to incorporate into Navy training and learning.

The Integrated Training Organization will conduct the training dictated by the CINC (quadrant I) and resourced by OPNAV through the Fleet. 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 for IDTC training, Fleet training 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 for 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 also 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.

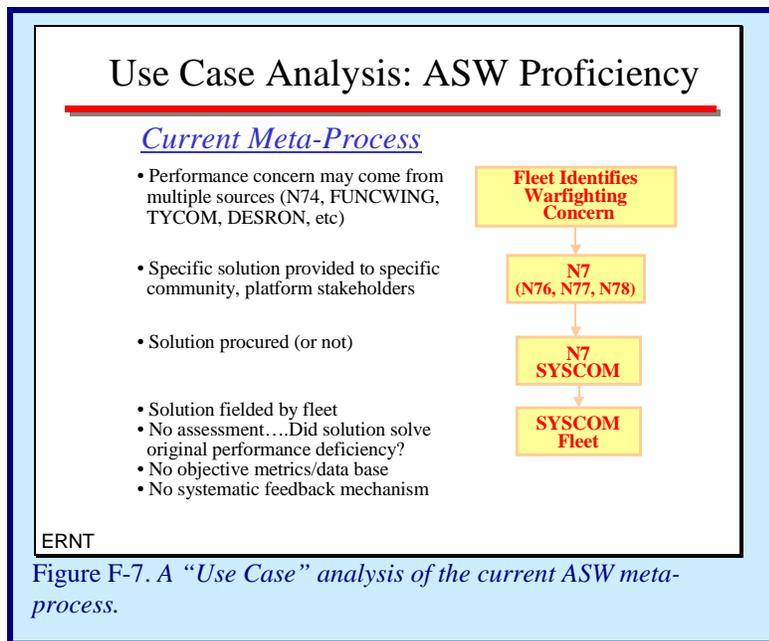


Figure F-7. A “Use Case” analysis of the current ASW meta-process.

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.

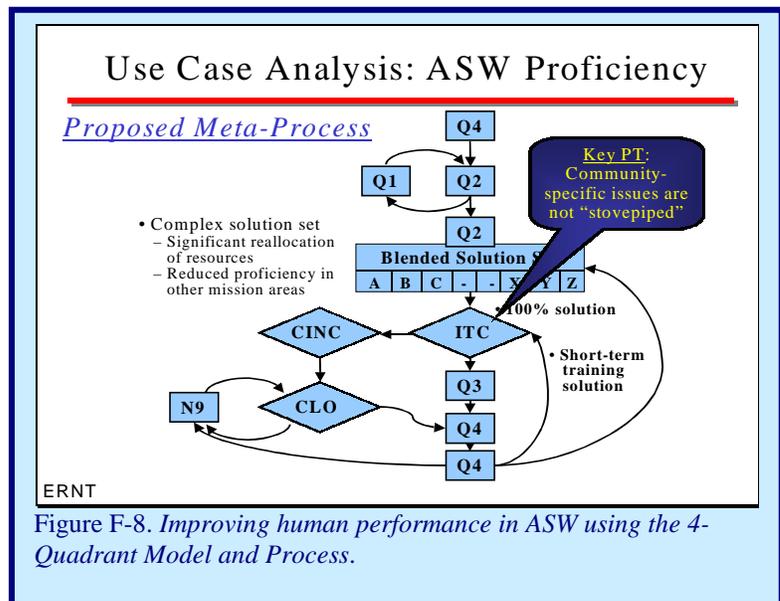
We developed 10 specific Use Cases that would approach the 4-Quadrant Model from many different ways:

- New Anti-Terrorism/Force Protection requirement
- Loss of a live ordnance range
- Communicating CNO's Top 5 Issues
- Accident rate of an aircraft type increases
- Virtual reality – New development (technology) in tactical training
- ASW proficiency requires improvement
- General Military Training requires improvement
- Major new system (DD-21) acquisition
- Career Development (“Learning Continuum”) instituted
- Inport oil spill frequency increases.

The “ASW Proficiency” Use Case outlined in figure F-7 and below is illustrative. In this particular scenario, the Fleet CINC raises a concern about ASW proficiency 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 approach raises several problems. Assuming the original assessment was based on objective, Navy-wide performance standards and metrics, the presumption that the issue was a training deficiency vice a system or manpower deficiency may have caused everyone to overlook other, more cost-effective solutions. Given a training solution, the options of classroom, versus additional live, simulated, stimulated, or distributed learning mediums may not have been considered. Finally, the possibility of a blended/optimum training solution for the individual and the team probably was not addressed.

The problem with the current approach (figure F-7) starts at the requirements determination phase. The requirement now is identified in terms of developing a course for a specific community. The solution is dictated, with neither an analysis of the problem nor the development of metrics for systematic feedback.



This same ASW job performance deficiency was then considered using the 4-Quadrant Process. The results of this analysis, depicted in figure F-8, 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 is validated by the CINC (quadrant I) and then analyzed by the HPSO (quadrant II).
- The HPSO identifies several different blended human performance solutions (A, B, C, ...X, Y, Z) consisting of different training media, systems, manpower, etc. Its recommendation, as well as all of the other alternatives, are forwarded to the Fleet CINC for approval, then to quadrant III.
- After ITO concurrence, the training tools are built and fielded (quadrant III).
- The tools are employed and evaluated (quadrant IV).
- In this example, to meet ASW performance requirements, the CINC is required to reduce performance in another mission area.
- 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 gleaned several lessons from this Use Case. For example:

- The HPSO 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, CHNAVPERS, etc.) become involved.
- The CLO (VCNO) 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 HPSO then develops the optimal solution to the stated requirement that could reach across communities. If there 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

[New process & specific recommendations:](#)

- Creates alignment with organizational tension
- Creates end-to-end accountability
- Establishes Fleet CINC as final authority for human performance requirements
- Requirements stated as operational tasks
- Single OPNAV Training Focal Point resources all training solutions (except acquisition)
- A "browser" function is needed to continually assess job performance issues & concerns, and apply solutions
- Allows VCNO to resolve points of conflict & identifies investment opportunities, economies of scale, ...

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Figure F-9. The final insights from the Use Cases

Use Case Insights

We learned a great deal from applying the Use Cases to the model. (See figure F-9.) 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 earlier in our report: flexibility, learner centrality, adaptability, self-renewability, accountability, and so forth.

This Use Case also provides some of the following insights:

- Organizational tension is useful and end-to-end accountability for the training process is essential.
- The Fleet CINCs (or equivalents) should have the pivotal role in establishing human performance requirements.
- Requirements are tasks to be performed.
- Resources must be coordinated for CNO at OPNAV.
- There must be a sensory system at the waterfront and on the flight line to match needs with solutions.
- VCNO, the Chief Learning Officer, can adjudicate conflicts in priorities for requirements, investments, and so on.