NPS-IS-17-002

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

UNDERSTANDING AND RETAINING TALENT IN THE INFORMATION WARFARE COMMUNITY

by

Mark E. Nissen and Simona L. Tick

February 2017

Approved for public release; distribution is unlimited

Prepared for: Chief of Naval Operations, N1T

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From-To)*
1 October 2016	Technical Report	10/01/2015 – 02/28/2017

4. TITLE AND SUBTITLE

Understanding and Retaining Talent in the Information Warfare Community

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Mark E. Nissen and Simona L. Tick

5d. PROJECT NUMBER
NPS-N16-N334-A

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) AND ADDRESS(ES)

Naval Postgraduate School

8. PERFORMING ORGANIZATION REPORT NUMBER
NPS-IS-17-002

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Chief of Naval Operations, N1T

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The Navy Information Warfare Community (IWC) provides a vital, sophisticated capability to address increasingly dynamic and unpredictable threats around the world. The problem is, the same skills and capabilities that make IWC personnel so valuable to the Navy also make them valuable to myriad firms in industry and organizations elsewhere beyond the Services. Moreover, such skills and capabilities are *directly transferrable* to industry. As a result, many talented information warriors are leaving the service at the midpoints of their military careers. Further, unlike other Navy communities (e.g., Aviation, Nuclear), in which clear career guidance and well-established incentives (e.g., bonus and retention pay) are in place, the comparatively inchoate IWC does not appear to benefit similarly, and given the unique nature of the IWC, it's not entirely clear what "talent" means in this community. Indeed, *talent* seems likely to be a highly situated and nuanced concept—far from general and monolithic—that is aligned with a person's knowledge and capability within an organization setting. Understanding talent represents the first step toward identifying and retaining the best IWC people before they leave the Service. This qualitative study addresses the issue directly, building up a grounded understanding of *IWC talent* and identifying both positive and negative issues driving talented people's decisions to leave or stay in the Navy. Results elucidate unique aspects of IWC talent and retention, in addition to attributes and issues that information warriors share with other Service members, and they highlight opportunities for Navy leaders to address talent and retention in the IWC and beyond.

15. SUBJECT TERMS
Navy; personnel; retention; talent; quality; incentives; qualitative; grounded.

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Mark Nissen
Unclassified	Unclassified	Unclassified	UU	77	**19b. TELEPHONE NUMBER** ***(include area code)*** 831-656-3570

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

THIS PAGE INTENTIONALLY LEFT BLANK

NAVAL POSTGRADUATE SCHOOL
Monterey, California 93943-5000

Ronald A. Route
President

Steven Lerman
Provost

The report entitled "Understanding and Retaining Talent in the Information Warfare Community" was prepared for and funded by the Chief of Naval Operations, N1T.

Further distribution of all or part of this report is authorized.

This report was prepared by:

Mark E. Nissen
Professor

Simona L. Tick
Lecturer

Reviewed by:

Dan Boger, Chairman
Information Sciences

Released by:

Jeffrey D. Paduan
Dean of Research

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

The Navy Information Warfare Community (IWC) provides a vital, sophisticated capability to address increasingly dynamic and unpredictable threats around the world. The problem is, the same skills and capabilities that make IWC personnel so valuable to the Navy also make them valuable to myriad firms in industry and organizations elsewhere beyond the Services. Moreover, such skills and capabilities are *directly transferrable* to industry. As a result, many talented information warriors are leaving the Service at the midpoints of their military careers. Indeed, nearly half of our study participants indicate that they are likely to leave the Service when the next opportunity arises.

Further, unlike other Navy communities (e.g., Aviation, Nuclear), in which clear career guidance and well-established incentives (e.g., bonus and retention pay) are in place, the comparatively inchoate IWC does not appear to benefit similarly. A number of our IWC participants indicate that career guidance is inadequate, for instance, and some remain uncertain what to do next. Alternatively, other participants appear to understand what needs to be done next, but they express frustration at the limited number of opportunities for milestone tours and command.

Given the unique nature of the IWC, it has not been entirely clear what "talent" means in this community. Through this grounded study, however, we describe how *talent* is a highly situated and nuanced concept—far from general and monolithic—that is aligned with a person's knowledge and capability within an organization setting. Indeed, we identify what constitutes talent in the IWC: IT technical knowledge and the competence that it enables are fundamental, but we find nuanced differences between the cyber warrior and information communicator tribes. For the cyber warriors, IT technical knowledge and the ability to take effective actions within cyberspace are central to talent. For the information communicators, technical system knowledge and the ability to communicate within the organization are key. For both tribes, talent does not appear to correlate positively with rank.

Moreover, we articulate why some talented people choose to leave the Navy while others choose to stay in: The enjoyment of one's work is paramount, but we find

nuanced differences between the cyber and communicator tribes. For the cyber warriors, who appear to enjoy their cyber jobs especially much, being able to specialize and continue with cyber jobs seems likely to keep them in the Navy, whereas the requirement to generalize and rotate into less enjoyable jobs seems likely instead to push them into the civilian sector. For the communicators, the opportunity to either specialize or reach command seems key to keeping them in the Navy, whereas if unable to do either, they seem likely instead to leave for civilian jobs. For both tribes, situated characteristics such as motivational versus toxic leaders and quality of life issues must balance with other motivational and dissatisfying factors.

Thus, we identify four significant retention risks: 1) Rotation out of cyber (and other enjoyable, specialized) jobs, 2) generalization through job breadth, 3) dearth of command opportunities, and 4) repeated exposure to toxic leaders. We then outline recommendations for retaining IWC talent. One recommendation is to propose an alternate career path for talented officers who do not seek command, one that would enable such officers to "homestead" in cyber and other jobs as specialists instead of generalists. This could potentially address the first two retention risks directly, and it could have an indirect effect on the third by reducing the amount of competition for the limited number of milestone and command billets. Another recommendation could consider breaking some very large commands into smaller parts, which could accommodate more officers seeking command. The final recommendation proposes to include command climate survey results on leaders' fitness reports; to identify talented IWC personnel; and to grant them limited access to more-senior officers above their direct superiors.

Of course, much work would be required to implement recommendations along these lines, and it is unclear what impact they would have upon the detailing process, morale, perceived fairness, recruiting, chain of command, and other areas. Hence we leave the answers to such questions as topics for future research. Nonetheless, they offer potential to help to keep talented information warriors from leaving the Navy.

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

The Navy Information Warfare Community (IWC) provides a vital, sophisticated capability to address increasingly dynamic and unpredictable threats around the world. These consummate professionals are both producers and consumers of information, and they play a critical role in collecting, processing, exploiting and disseminating information of all types, using a powerful array of diverse technologies ranging from terrestrial computer networks to satellites in space. Arguably no other warfare specialty in the Navy could complete its missions effectively without the IWC, and with the advent and proliferation of cyber operations, information warriors are conducting strategic and tactical, offensive and defensive missions of their own.

Effective performance in the IWC requires a somewhat unique set of skills and capabilities, which are distributed across a relatively broad collection of professional designators and specialties. Many such skills and capabilities are learned through formal education and job specific training, but most people say that the majority of key knowledge is learned on the job, through personal and professional experience, and even dependent upon innate capabilities and personality attributes.

The problem is, the same skills and capabilities that make IWC personnel so valuable to the Navy also make them valuable to myriad firms in industry and organizations elsewhere beyond the Services. As a result, many talented information warriors are leaving the Service at the midpoints of their military careers. Network administrators, computer security specialists, technology consultants, and other relatively high level and high value jobs maintain strong demand for IWC talent, and many firms in industry and elsewhere offer higher—in some cases much higher—compensation levels than military jobs, generally without the need for periodic deployment and frequent relocation.

Indeed, a "war for tech talent" (Rosenbush, 2016) is being waged in industry, with many companies fighting to attract and retain technical employees (Nash, 2016). Even fresh college graduates, with no experience, are commanding high starting salaries and generous incentives to switch employers, and many such young employees report receiving 20 calls each day from recruiters trying to persuade them to change jobs

(Dodge, 2016). This is not a complete surprise, however, for retention of information warriors has been problematic for a number of years (Linn, 2009), and the Chief of Naval Personnel expresses great concern about attrition (LaGrone, 2014). Although the metaphoric tide of attrition has been flowing against the Navy for several years (Snodgrass, 2014), its effect on the IWC's future seems particularly ominous.

Further, the IWC is comparatively new. The Information Dominance Corps (IDC) was created less than a decade ago and renamed "IWC" in 2016. Alternatively, other Navy communities (esp. Surface Warfare) have been in existence since the U.S. Navy's inception over two centuries ago, and their predecessors can be dated back several millennia to the beginning of navies in general. Even naval aviation has been operating for roughly a century now. Hence the IWC lacks the history and experience of other Navy communities, and it is therefore less clear which selection, promotion and retention techniques are comparatively more versus less effective in the IWC than in other communities. For instance, unlike other Navy communities (e.g., Aviation, Nuclear), in which clear career guidance and well-established incentives (e.g., bonus and retention pay) are in place, the comparatively inchoate IWC does not appear to benefit similarly.

The IWC is also comparatively very heterogeneous. The community is comprised of five designators and corresponding professions: 1) 1800 – Oceanography, 1810 – Cryptologic Warfare, 1820 – Information Professional, 1830 – Intelligence, and 1840 – Cyber Warfare Engineer. Although all five professions work with information, and some reflect partially overlapping skill sets, many of the kinds of jobs performed and the kinds of education and training required remain quite different. This suggests that demands for information warrior talent in industry and beyond are likely to differ across professions also. Hence even if we were to introduce incentives along the lines of those noted above, they might have to vary—perhaps considerably—from one designator to the next. For instance, very little or no incentive may be required to retain oceanographers—based solely upon industry demand for their skills and capabilities—whereas the Navy may be unable to match the incentives offered for cyber warriors and information professionals that benefit from high industry demand. Even for this relatively small community, a one size fits all approach to IWC talent retention may be inappropriate.

Moreover, given this relatively new, heterogeneous and unique nature of the IWC, it's not entirely clear what "talent" means in this community. Do the elements of talent for an oceanographer align well with those of a cyber warfare engineer, for instance? Is the demand for cryptologic warfare skills comparable to that for information professionals? Or does talent vary across designators and professions, and perhaps along the rank structure as well? Indeed, *talent* seems likely to be a highly situated and nuanced concept—far from general and monolithic—aligned with a person's knowledge and capability within an organization setting. Until we can identify what constitutes talent, we will likely have difficulty differentiating between personnel with a lot versus a little of it, and hence we risk promoting and retaining the wrong people, while allowing—or even worse, encouraging—our best personnel to leave the Navy.

Understanding talent represents the first step toward identifying and retaining the best IWC people before they leave the Service. This qualitative study addresses the issue directly through a three part research question: 1) What constitutes talent in the IWC? 2) Why do some talented people choose to leave the Navy while others choose to stay in? 3) How can we retain talent in the Navy? Eschewing the idea of using deduction and quantitative testing through one or more top-down theoretic models of talent—approaches that presume a solid understanding of what talent is and how to measure it—we choose instead to employ qualitative methods and build up a grounded understanding of *IWC talent*. Indeed, given the situated and nuanced nature of talent likely to exist, we look to develop and articulate an understanding of IWC talent by talking to people in the IWC directly. We all know the saying, "I know talent when I see it," so we're looking to understand what it is that IWC people see when it comes to talent.

Likewise, instead of speculating about why some people are leaving the IWC and why others are deciding to stay in the Navy, we ask people in the IWC why they're choosing or considering one path or another, and we ask people also about friends and colleagues of theirs, building up similarly a grounded understanding of what people are looking for or missing. This can be highly informative in terms of working to develop, apply and refine incentive systems, highlighting opportunities for Navy leaders to address talent and retention in the IWC. Further, the techniques illustrated through this study can

inform follow-on work to identify talent in other Navy communities, the results from which should generalize well and prove highly useful through comparison and contrast.

This qualitative approach exhibits no prejudice or judgment against quantitative methods. Indeed, we are conducting a quantitative companion study in conjunction with this one. Every research method has its comparative strengths and weaknesses, which are known well. Quantitative methods offer the power of numbers and statistical analysis, for instance, and they are able to address large volumes of data, generally quite quickly. Internal validity and reliability are relatively strong generally with quantitative methods, and researchers have an easier job of claiming to be "objective" or "rigorous." However, quantitative methods have a difficult time addressing "how" and "why" research questions, and even many "what" questions can be troublesome. Notice that the three part research question centering this study includes a "what," and "why" and a "how."

Metaphorically, quantitative methods are air campaigns. They strike quickly, generally from the top down, and can cover great areas, generally with comparatively little risk to the cyber warriors conducting the missions. However, they leave many targets untouched and are rarely effective alone. Campaigns in the Middle East over the past 15 years help validate this characterization. Indeed, experience suggests that lasting results require ground campaigns also, some aspects of which involve close, even house-to-house combat. Metaphorically this is qualitative research: Getting on the ground and close to data, understanding them in depth, despite their inherently messy and disorganized nature. There is a time and place for both research methods. Given our interest in trying to define *talent*, the qualitative approach seems most appropriate at this stage of our study campaign.

The balance of this report begins with some background information regarding the IWC, after which we elaborate on our qualitative research method. The bulk of the report articulates our qualitative data analysis and findings, which we summarize through a set of conclusions to complete the report. Three appendices are included with the qualitative instruments used in this study: A) recruitment script, B) background information questionnaire, and C) common interview questions.

II. BACKGROUND

In this section we summarize very briefly the nature and composition of the IWC. We also summarize some relevant previous research on retention and talent.

A. IWC NATURE AND COMPOSITION

As noted above, the IWC is comparatively new and comprised of heterogeneous elements. Known until January 2016 as the Information Dominance Corps (IDC), the IWC was effectively created within the US Navy in 2009. It aligns the OPNAV N2 (Intelligence), N6 (Communications Networks), and elements of N3 (N39, information and cyber operations) and N8 (unmanned systems programs and resources) into a unified organization (USNA, 2016).

The IWC is led by the Deputy Chief of Naval Operations for Information Warfare (DCNO N2/N6). This represents a transition in the evolution of naval warfare, designed to elevate information as a main battery of naval warfighting capabilities and to establish naval prominence in intelligence, cyber warfare and information management. Indeed, technological advances make information both a formidable weapon and a constant threat, and information has emerged to represent a unique and distinct type of warfare (IDC, 2016).

Some critical missions include the development and defense of intelligence, networks and systems; management of critical warfighting information; provision of command and control capabilities; and maintenance of information technological edge. Operationally, many of these missions are organized and conducted through the Fleet Cyber Command/10th Fleet (C10F). This represents the Navy component of the US Cyber Command, the Navy authority for cyber operations, the Navy service cryptologic element, and the operational authority and capability provider for information and cyber operations (USNA, 2016).

Several, somewhat interrelated professions comprise the IWC. These include Intelligence, Information Warfare, Information Technology, Meteorology and Oceanography, and Space (IDC, 2016). Officer designators and corresponding

professions include 1800 – Oceanography, 1810 – Cryptologic Warfare, 1820 – Information Professional, 1830 – Intelligence, and 1840 – Cyber Warfare Engineer.

Briefly, Oceanography personnel provide actionable information associated with meteorologic, climatologic, oceanographic and space environment observations and prognostic products (USNO, 2016). Cryptologic Warfare and Cyber Warfare Engineer personnel engage principally in computer network operations, which can be viewed conveniently in terms of network attack, defense and exploitation. Information Professional personnel deliver cyber ready systems and capabilities to the Fleet, and they operate Navy networks 24x7 to support the full spectrum of missions. Intelligence personnel in turn provide evaluated intelligence on adversaries' capabilities and intentions to support planning and operations at all levels of warfare (USNA, 2016).

The IDC's five year (2012 – 2017) human capital strategy includes four primary goals: 1) manage the community as a total force; 2) build competencies through training, education and experience; 3) strategically integrate and align the workforce with mission and capability requirements; and 4) create a warfighting culture (NIDC, 2016). The vision is to "attract, develop, and retain a cohort of highly trained and competent officers, enlisted, and civilian professionals who are fully integrated with the Navy's combat forces, and delivering warfighting effects to Naval and Joint forces across the full spectrum of military operations" (NIDC, 2016: 6). The retention of talented personnel is clearly central to this strategy.

B. RETENTION AND TALENT RESEARCH

Retention in the Military has been studied for many decades (Singer & Morton, 1969; Rocco et al., 1977; Hurlock & Montague, 1982; Cooke & Quester, 1992; Sullivan, 1998; Christensen et al., 2002). A great many retention studies look backward, trying to make sense of historic data. Alternatively, some promising studies estimate retention models for officers in general (Parcell et al., 2003), in communities such as aviation and surface warfare (Parcell & MacIlvaine, 2005), and to assess diversity (Kraus, 2013). By developing models, such studies equip us to look prospectively, which is important. We're working to address *future* talent losses, not simply to understand those that took place in the past.

One relatively recent study (Snodgrass & Kohlman, 2014) also looks prospectively. Instead of developing models from historic data, however, it grounds data by asking sailors directly about their plans in terms of staying in or leaving the Navy. This direct, prospective approach aligns well with our interest in developing a grounded understanding. Although the present study focuses more on talent than retention, there is clear complementation.

Nonetheless, the idea of asking sailors directly is not new, for the Navy administers broad surveys routinely. For instance, until being discontinued several years ago, the ARGUS survey (Frith, 2007) would ask sailors about their quality of life and like questions. The Career Viewpoint Survey (CNP PAO, 2014), as another instance, similarly invites sailors to provide advance input regarding career decisions prior to key milestones (esp. end of duty obligated service, end of minimum service requirement, projected rotation date). Soliciting advance input seems important[1], particularly if the Navy is sufficiently agile to do something to prevent talented people from leaving based on the results.

Although such surveys are advertised as voluntary and confidential, it is unclear whether sailors have complete trust in the confidentiality of an official Navy system or whether they feel that their inputs matter (Anonymous, 2015). As explained in the next section, our approach of conducting interviews anonymously—for research purposes—and destroying any personally identifiable information, helps to bridge the confidentiality barrier. Plus, we focus on one community at a time, with a more situated and concentrated lens, to help convey the potential visibility of our results.

Given the relative newness of the IWC, this community has not received nearly as much retention attention as others (esp. Aviation, Surface Warfare), yet the IWC is critically important today. One, particularly relevant study (Linn, 2009) sheds some metaphoric light on information warriors specifically. Briefly, the study employs a survey instrument administered to Information Warfare officers (Cryptologic Warfare officers) at the Naval Postgraduate School (NPS). Like the Snodgrass & Kohlman (2014) study noted above, it is largely prospective in nature. Collecting data from students at the NPS aligns well with our interest in developing a grounded understanding as well. NPS

[1] The Navy also administers the Career Viewpoint Exit Survey to members as they leave the service.

students have an opportunity to detach from the demands of everyday Fleet work and to reflect upon their careers—past and future—over 18 months or more while in school.

This excerpt from Linn's (p. xxii) report provides a summary:

> This survey shows that IW [Information Warfare] personnel believe that, on average, they can earn $25,100 more annually in an equivalent civilian job, and 88% of those surveyed think a CSRB [Critical Skills Retention Bonus] would be helpful. When asked what were the biggest negative IW community retention factors, participants answered (in order of importance): civilian career opportunities, pay, IW leadership, family quality of life, and community direction. When asked what their own biggest negative retention factors were, participants answered (in order of importance): IW leadership, job advancement, education and training opportunities, pay, and career opportunities. This survey shows that, in addition to the monetary and nonmonetary solutions … the IW community might be able to improve retention further by focusing on improving IW leadership and community direction. … [Further,] shortages at O-5 are a direct result of too many prior enlisted officers who are not willing to stay in past retirement eligibility at the O-4 pay grade. While a CSRB may provide a short-term solution, nonmonetary solutions should be considered to provide an increase in long-term retention.

This summary reflects several characteristics that may prove helpful with focusing our interviews. For instance, the perception that information warriors can earn more money by leaving the Navy than by staying in appears to be an important consideration to listen for, as will the idea of bonus pay (e.g., CSRB). The other "negative retention factors" (esp. leadership, job advancement, education and training opportunities, pay, career opportunities) appear likewise to be important considerations to listen for during interviews. Of course, in this present study, we're not focusing on retention per se; rather, we're concentrating in particular on retaining *talent*.

Further along these lines, the combination of relative newness and critical importance raises several comparisons with the advent of the Special Forces a few decades back (Breuer, 2015). Once someone joins the Special Forces—and is both trained and acculturated accordingly—it is rare for that person to rotate back into his or her home community. Quite the opposite, once trained, acculturated and experienced, that person generally spends the remainder of his or her military career in the Special Forces community, doing special forces work. This has potential to represent another important

consideration to listen for during interviews, as many information warriors may be forced to rotate out of jobs that they enjoy, and for which they train specifically.

Talent remains a challenging topic of study, however (Corley et al., 2015). A decade ago, research and consulting in this area were deemed problematic, with little data to support practitioner claims (Lewis & Heckman, 2006). Later review research noted significant progress but remaining issues with clear definitions and conceptual boundaries (Collings & Mellahi, 2009). This theme continues with more recent, extensive literature reviews (Tarique & Schuller, 2012).

Alternatively, a promising link established with knowledge management (Schroevers & Hendriks, 2012) helps to bring considerable academic rigor and successful practitioner experience to bear on the talent management topic, which is consistent with the Navy's own knowledge management practices: "Knowledge management is the alignment of people and processes, enabled by technology" (DON CIO, 2016). This suggests strongly that talent is not some universal state or trait. Rather, it appears to be highly situated and nuanced—far from general and monolithic—that is dependent, for instance, upon the specific processes and technologies associated with the knowledge required for a person to exhibit talent. A "talented" person in one domain may represent an "untalented" person in another.

Consider, for example, a Chess grand master—a truly talented person in the domain of Chess—who is left stranded in the middle of the Amazon Jungle. Without considerable training and experience *with jungle survival*, would such person even live through a single day? Likewise, take an Amazon Jungle native—a truly talented person in the domain of jungle survival—and enroll him or her in a Chess tournament. Without considerable training and experience *with Chess*, would such person even win a single game? Nissen (2014) goes further, explaining how the *balanced* interaction between people, processes, organizations and technologies is key. This perspective gives ever greater credence to our bottom-up, situated, grounded approach to understanding talent, beginning with the IWC: Talent seems highly likely to differ tremendously across organizations, domains and circumstances.

THIS PAGE INTENTIONALLY LEFT BLANK

III. RESEARCH METHOD

In this section we elaborate on the research method. As noted in the introduction, we seek a direct, grounded understanding of IWC talent, so we employ very well-established, grounded theory building methods (Glaser & Strauss, 1967; Strauss & Corbin, 1990). Such methods equip us to build up an understanding inductively, from the data themselves, as opposed to relying upon a deductive, top-down model likely to be too general and coarse for our situated and nuanced concept *talent*.

Moreover, it provides a well-accepted and systematic process for qualitative research, one that both guides and encourages repeated iteration of data collection and analysis (Eisenhardt, 1989). Such repeated iteration is noted widely as key to grounding theory in the data of a qualitative study (Glaser & Strauss, 1967) and enables us to focus persistently on the IWC as a potentially unique and revelatory case to study (Yin, 1994). Results from this case study could then become even more useful in comparison with other Navy communities as complementary and contrasting cases, offering potential to elucidate insights unattainable through other research methods.

The site selected for this study provides a rich environment for investigating IWC talent. We're able to build upon prior work (Linn, 2009) that asked information warriors questions directly while they were studying at the NPS, and we're able to solicit their prospective input regarding factors that could influence their *future* decisions to leave or stay in the Navy. Further, students at NPS (and like education institutions) have had an opportunity to detach from the demands of everyday Fleet work and to reflect upon their careers—past and future—over 18 months or more while in school. This enables study participants to think over the longer term, with fewer, everyday, pressing issues to contend with, which arguably serves very well our research purpose of understanding IWC talent as a revelatory case.

Studying a revelatory case such as this represents theoretical sampling (Glaser & Strauss, 1967) and makes it suitable for analytic generalization (Yin, 1994). As demonstrated several years back in the context of strategic learning (Thomas et al., 2001: 332), this calls in part for case selection of "a unique exemplar of a particular phenomenon to bring key dimensions to light." Through study of this revelatory case, we

seek to bring the situated and nuanced nature of talent to light and to illuminate patterns with potential to inform retention.

We employ three techniques for data collection: 1) document review, 2) strategic contact, and 3) interview. Briefly, document review provides important background information about the IWC. It also helps the Investigator to ask informed interview questions. Additionally, the Researcher has candid, confidential and sustained access to a Strategic Contact (i.e., a senior IWC officer). This naval officer is very experienced with military organizations and warfare processes in general, and he has considerable experience with cyber warfare in particular. This data-collection technique complements the other modes well. The Strategic Contact represents a ready source of military grounding and IWC perspective for consultation by the Investigator over the course of the study.

Semi-structured interviews (Rubin & Rubin, 1995) comprise the central method for collecting our qualitative data. Although we do pose a small number of common questions to all participants, such questions are very open-ended, asking participants to tell about their experiences, feelings, observations and perceptions. We want to hear what the participants have to say—in their own words—not impose a bunch of theoretic, survey questions. Further, the interviews are conducted with probing (Nelson et al., 2000) and snowballing (Reich & Kaarst-Brown, 1999) techniques, and they continue until theoretical saturation (Glaser & Strauss, 1967) is reached. Because we focus in particular upon IWC talent, which is a relatively narrow topic, such saturation is reached after the first set of interviews, indicating sufficiency in terms of the sample frame summarized in Table 1. Each interview involves about one hour of oral interaction.

It is important to highlight that this is a qualitative study, not a quantitative analysis, and our interest is much more toward theory building than theory testing. Hence we perform theoretical sampling (Glaser & Strauss, 1967), not statistical sampling, and we pursue analytic generalization (Yin, 1994), not statistical generalization. As such, we adhere to very well-established procedures for qualitative data collection and analysis (Denzin, 1994). Such procedures do not dictate that we attempt to develop large, random samples.

Quite to the contrary, we look for a small sample that will be informative, that we can understand in-depth, and that will reveal both similarities and differences across participants. Additionally, we work deliberately to select participants who are likely to provide the kind of grounded data that we seek through interviews (Rubin & Rubin, 1995). Toward these ends, our recruitment process emphasizes volunteer participants. The idea is that people who volunteer are likely have something to say, both positive and negative. This helps to ensure smooth, candid, flowing interviews, and it increases the likelihood of collecting data that are considered important by the participants, particularly as our interview techniques enable us to probe and home in on different topics across the various participants. This provides considerable contrast to mandatory surveys with standard questions. Our recruitment script is included in Appendix A for reference.

Nonetheless, we ensure that our sample frame includes at least one participant from each of the five IWC subcommunities, so we can collect data representing each perspective. We also ensure that we collect the same background information from each participant, so we have a common basis of comparison. This is the same background information used in a companion quantitative study, so we can compare qualitative and quantitative findings and results. The background information questionnaire is included in Appendix B for reference too. Plus, we further ensure that we ask at least some of the same interview questions to all participants, so we establish a base set of responses for comparison and contrast. Most study participants answer these questions in writing before their interviews. This streamlines the process and provides a good basis for asking other questions through probing and homing in on different topics across the various participants. The common set of interview questions is included in Appendix C for reference as well.

This purposeful sample concentrates on the two, mid-career organization levels (i.e., O3 & O4) noted by our Strategic Contact as particularly vulnerable at present and prone to problems with retention of talent. It includes participants representing each of the IWC's five professions: Oceanography, Cryptologic Warfare, Information Professional, Intelligence, and Cyber Warfare Engineer. This enables us to look for similarities and differences—even within the IWC—across specialties, and it offers

potential to gain insight into alternate situations and nuances that may determine and affect corresponding talent.

Table 1. Sample Frame

Participant	Rank	Area	NPS Curriculum
P1601	O4	Cyber Warfare	Computer & Information Science
P1602	O4	Cryptologic Warfare	Electrical Engineering
P1603	O4	Oceanography	Meteorology & Oceanography
P1604	O4	Cryptologic Warfare	Electronic Systems Engineering
P1605	O3	Cryptologic Warfare	Cyber Systems Operations
P1606	O3	Information Professional	Space Systems Engineering
P1607	O3	Information Professional	Space Systems Operations
P1608	O3	Cryptologic Warfare	Cyber Systems Operations
P1609	O3	Intelligence	Cyber Systems Operations

Notice that all study participants are assigned currently (or were assigned recently) to the NPS for graduate education. As noted above, such NPS students are highly suitable for this study, because we're collocated on campus with participants, who have an opportunity to detach from the demands of everyday Fleet work and to reflect upon their careers—past and future—over 18 months or more while in school. It is important to note that these are not the typical kinds of students used in much academic research. Indeed, far from the inexperienced college freshmen who participate in myriad psychology, marketing and other studies—the external validity of which is wholly suspect—most NPS students are mid-grade military officers (O3 & O4), with a decade or so of experience, many of whom come to the NPS directly from operational tours at sea, in war zones and like circumstances. These people know the Navy, and their incorporation in our sample frame enhances the external validity of this study greatly.

We also list the participants' curricula of study. This helps with our theoretical sampling too. Earning a graduate degree represents a transitional act in many people's careers, whereas others continue to specialize. In our sample, we find some people who make career pivots (e.g., IWC Intelligence background followed by graduate education in Cyber Systems and Operations), whereas others continue to specialize (e.g., IWC Oceanography background followed by graduate education in Meteorology & Oceanography). Including career pivots in addition to specializations enriches the study.

Further, to enhance candid responses, and to reassure participants regarding anonymity, we choose not to use a tape or video recorder for interviews. Nonetheless, extensive notes are taken and summarized immediately following each interview, and collocation on the NPS campus enables the Investigator to follow up with interviewees where deemed necessary to clarify issues, to delve more deeply into topics of interest, or simply to verify facts, notes and comments recorded by the Investigator.

In terms of coding, following Gioia et al. (1994) in part, we employ a multistage analytic approach to data collection, analysis and interpretation. In the primary stage, data collected and analyzed through the course of our interviews lead to first order coding (van Maanen, 1979), accomplished in a manner comparable to open coding (Strauss & Corbin, 1990), which reflects terms used directly by organization participants. In other words, adhering to our grounded approach, we employ *in vivo* codes in the primary stage, using terms from the interviews themselves to code each passage and section. This helps to keep the coding process as close as possible to the data. Investigator reactions and analyses generate corresponding first order interpretations, which are meaningful to organization participants also. Where warranted by theoretical sampling, many first order interpretations may lead us to additional data collection and analysis at the same level, reflecting terms used directly by organization participants. This first order analysis grounds our interpretations in the data.

In the secondary stage, we treat first order interpretations as "data" for second order analysis. This second order analysis augments its first order counterpart with theoretical insight and comparison, bringing in the investigator's perspective that is informed by the literature, in a manner comparable to axial coding (Strauss & Corbin, 1990). Gioia et al. (1994: 367) explain the benefits of using such a multistage approach.

They include exposing and integrating different aspects of the phenomena of study that are revealed separately through first versus second order analysis and interpretation.

> Although informant views can reveal the rich means or methods by which members can construct reality … they usually do not address the deep structure of experience. Similarly, although the researcher views tend to gloss the richness of lived experience, they place in *bas-relief* the dimensions or structure of phenomena. Because the knower and known are interdependent in this process of understanding, however, the most desirable approach is to triangulate insider and outsider views.

As with the first interpretation stage, these second order interpretations may lead us in turn to collect and analyze additional data, to refine our first order interpretations, to augment our second order analysis, and so forth. This second order analysis bridges grounded data and interpretations with theory, and it helps us with the emergence of themes, accomplished in a manner comparable to selective coding (Strauss & Corbin, 1990).

Additionally, regarding the Investigator's background and biases, he is a tenured full professor of Information Science and of Management at the NPS, and although he is a Navy civilian, he comes to the study without operational military experience. This allows a relatively fresh look at the IWC, but one that includes considerable familiarity and experience with knowledge, talent and retention in industry and other sectors outside the Military. Nonetheless, after many years of conducting research in the military domain, the Investigator is far from a naïve outsider.

Further, the Investigator comes to the study with no particular statement to make or point to prove. Rather, he comes seeking to understand IWC talent inductively, from a grounded perspective, and to elucidate possible approaches to retaining talented IWC personnel. Hence initial coding of data is conducted in a manner that lets the data speak for themselves and that uses study participants' own terms. This helps to ensure that initial interpretations are both grounded firmly in the data and meaningful to organization participants.

Finally, in addition to the well-accepted methods and techniques outlined above, the study also employs many of the proven tactics for qualitative research outlined by Miles and Huberman (1994: 262-276), which include taking a low profile, sampling

people with different views, triangulating across multiple data-collection techniques, multiple verification efforts, and seeking an *emic* perspective (Bernard, 1998). Such tactics serve to mitigate potential bias (e.g., stemming from a single Investigator). Moreover, repeated member checking (Denzin, 1994) is accomplished through periodic interaction with our Strategic Contact and follow up with the study participants. Comments pertaining to the interview summaries and findings are also received from the Strategic Contact and other participants in the study, and a preliminary summary of study findings and implications is shared with the participants for comment.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. RESULTS

In this section we report the study results. We begin by summarizing the backgrounds of our study participants. We then summarize the key first order codes applied to our interview data. This is followed by second order analysis and the emergence of themes from our qualitative study. The section concludes with summary discussion.

A. PARTICIPANT BACKGROUNDS

In this section we summarize the backgrounds of our study participants. The corresponding data are collected through the background questionnaires noted above and included in Appendix A for reference. The participant background information is summarized in Table 2.

Table 2. Participant Background Information

Question	P1601	P1602	P1603	P1604	P1605	P1606	P1607	P1608	P1609	Mean	Mode
Date of Commissioning	2004	2003	1998	2005	2006	2008	2007	2009	2006	2005	
Commissioning source	OCS	USNA	USNA	ROTC	USNA	USNA	USNA	STA	OCS		USNA
Prior Enlisted	Y	N	Y	N	N	N	Y	Y	N		N
Undergraduate College attended		USNA	USNA	Minnesota	USNA	USNA	USNA	Colorado	Florida		USNA
Year of graduation from college		2003	1998	2005	2006	2008	2007	2009	2006	2005	
College Major		Naval Architecture	Marine Engineering	Chemical Engineering	Math	English	Information Technology	International Affairs	Philosophy & Math		STEM
Undergraduate GPA		3.2	2.8	3.3	3.5	3.5	2.8	3.3	3.8	3.3	
Graduate degree	MS Telecom	MSEE	MS METOC			MSAE					N
Rate at commissioning	O1	O1	O1	O1	O1	O1	O1	O1	O1		O1
Designator at entry	Signal	Aviator	Submarine	SWO	IW	Aviator	IP	IW	Submarine		
Married, at commissioning date		N	N	Y	N	N	N	Y	Y		N
Dependent children, at commissioning date		N	N	N	N	N	N	Y	Y		N
Married, at current date		Y	Y	Y	N	Y	Y	N	Y		Y
Dependent children, at current date		Y	Y	Y	N	N	Y	Y	Y		Y
Current rate	O4	O4	O4	O4	O3	O3	O3	O3	O3		O3
Current designator	1840	1810	1800	1810	1810	1820	1820	1810	1830		1810
NPS Degree (obtained or sought)	PhD	PhD	PhD	MS	MS	MS	MS	MS	MS		MS
NPS Curriculum	Computer & Information Science	Electrical Engineering	METOC	Electronic Systems	Cyber Systems Operations	Space Systems Engineering	Space Systems Operations	Cyber Systems Operations	Cyber Systems Operations		Cyber Systems Operations
Stay in or leave Navy	Leave	Stay	Leave	Stay	Stay	Stay	Stay	Leave	Leave		

We note here that the P1601[2] is an Army officer assigned currently at the NPS. We include this participant in the study at the recommendation of our Strategic Contact, because of his extensive, joint, operational cyber experience, and because we have no others to represent the 1840 – Cyber Warfare Engineer community. All other participants are Navy officers. In addition to including background information for each participant, across all 18 questions, we show the mean for quantitative data and mode for qualitative

[2] All participants' responses are anonymous, with unidentifiable codes used instead of names.

data at the right. For instance, our average participant graduated from college with a 3.3 GPA and was commissioned in 2005, and our modal participant graduated from the US Naval Academy (USNA) with a STEM (Science, Technology, Engineering & Math) major. Further, nearly half of participants had prior enlisted service, and a variety of designators at commissioning are evident. Interestingly, whereas most participants transferred laterally into the IWC from other warfare communities (esp. Aviation, Submarine, Surface Warfare), a third of our participants entered the IWC directly as O1s.

Additionally, most participants were not married when commissioned, are married with dependent children currently, and are working currently on graduate degrees. Participants are divided about evenly between O3 and O4 in terms of current rank, and although all five IWC areas are represented, the most common designator is 1810 – Cryptologic Warfare. Finally, you can see from the table that the most common NPS curriculum is Cyber Systems Operations, and four of our nine participants indicate that they are likely to leave the Service when the next opportunity arises.

B. FIRST ORDER ANALYSIS

In this section we summarize the key first order codes and interpretations applied to our interview data. We begin by elaborating further on the coding and analytic process. Then we summarize data and interpretations for the IWC as a conglomerate, followed by summary and examination of its constituent parts.

1. Coding and Analytic Process Elaboration

As explained above, first order *in vivo* codes correspond to terms that are used directly by and that are meaningful to organization participants. They reflect Investigator interpretations, and they highlight problems, issues, expectations, goals and like considerations that seem important in terms of illuminating the nature of IWC talent and participants' thoughts regarding whether to leave or stay in the Navy. They are important in their own right, grounding our interpretations in the data, but they also provide fodder for our direct interpretation and second order analysis.

As explained above also, we receive participants' background questionnaires and answers to common questions in advance of the interviews. This streamlines the interview process and provides a good basis for asking deeper and individualized

questions through probing and homing in on different topics across the various participants. We read through each participant's inputs, highlighting all of the terms and statements that appear to have bearing on our research questions. Then we read through all participants' highlighted inputs, looking for common elements in addition to extreme responses. Common elements help to establish a basis of cross sample expectations, goals and like considerations, whereas extreme responses can signal problems, issues and like concerns that may underlie a potential talent retention risk. Of course, anything related to *talent* is highlighted, but we pay attention in particular to the associated stories, terms, actions and characteristics.

As explained above further, we take notes during the interviews, which we formalize immediately afterward. These notes represent our focused conversations with participants—predicated upon the background information and common questions—through which we concentrate on topics associated with such first level codes. Our interview transcripts are then read, coded and analyzed similarly, and the corresponding codes are integrated in with those deriving from the documents.

As an editorial note, the following discussion incorporates many quotations from study participants, which provide important depth, grounding and detail to the analysis. It is important to recall that we chose not to record the interviews, hence all such quotations are included here as they appear on our interview notes, many of which reflect fast, abbreviated writing, liberal use of acronyms, and incomplete sentences that can convey a sense of poor grammar and sentence construction. Nonetheless, our study participants are articulate, well-spoken, military officers: Any appearance of poor English is attributable solely to us and our use of hand written notes.

2. IWC as A Conglomerate

Here we summarize data and findings for the IWC as a conglomerate; that is, we look across all five designators, beginning with a summary of the key codes from interviews in Table 3. Notice that we include inputs for each participant in the table. This facilitates the task when we wish to refer back to a specific participant's interview transcript in order to gain more context regarding a certain term, something we do extensively in second order analysis.

Note that this table excludes codes and frequencies derived from the written documents (i.e., background questionnaire and common interview questions). Instead, it includes only codes applied through interviews. In essence, a layer of filtering and focus has taken place already, as our analysis of written responses has primed us for asking more specific and informative questions during the interviews and for placing participants' oral stories and responses in context with their backgrounds, issues, expectations and intentions. This enables us to concentrate on talent and retention, yet we remain in the contexts of the conversations and use the terms of our participants.

Table 3. Key Codes from Interviews

Code	P1601	P1602	P1603	P1604	P1605	P1606	P1607	P1608	P1609	Total
talent		2	1	2		1	2	1	2	11
technical		2		1	1	1	1	1	2	9
cyber	1	2				1		1	3	8
unfair			2			2	2	1		7
fun	1	1		1		1			3	7
promotion		1	2	1		1	1			6
enjoy		1	1			1	1	2		6
no guidance		1		1	1		1	1		5
people skill				1	1	1	1		1	5
learning				1	1		2		1	5
industry						2	1	1	1	5
transfer	1	2	1						1	5
senior officer			2		1			1	1	5
opportunity		1		1				2		4
experience		1			1		1	1		4
command				2				2		4
challenge					1	1	1		1	4
quality of life				1				2	1	4
communication			1				1	1	1	4
solve problems			1	1					2	4
family				1		1			2	4
personality			2	1						3
milestone tour		1				1	1			3
school				1			1		1	3
busy		2							1	3
money		1		1					1	3
fit						1			2	3

At this point, we're trying to get an overall sense of the data, looking simply for codes that get repeated. The data summarized in the table reflect frequency counts associated with a variety of first order codes applied to the interview transcripts, presented in descending order of frequency. For instance, the code *talent* is recorded 11

times across all of the interviews, with *technical* appearing nine times, *cyber* appearing eight times, and so forth. The full table, containing roughly 85 codes overall, is considerably longer than the truncated one summarized here. Here we include only those with codes applied three times or more.

Of course, since we are present for the interviews, asking questions and taking notes, we have much more than just the code frequencies: We have the transcripts and contexts of the conversations within which the codes are applied. For instance, the code *technical* is applied frequently in the same context as *talent,* for many participants appear to associate IWC talent with technical proficiency. Likewise, *people skill* and *communication* are both applied frequently in this same talent context also. Already we're developing an idea of what IWC officers see in terms of talent: Technical proficiency, people skill and communication (ability). Interestingly, *personality,* although largely an innate characteristic, is associated with talent by several participants also.

As another instance, we apply codes such as *unfair, promotion, no guidance, industry, opportunity, command, quality of life* and *milestone tour* frequently in the same context as being disappointed, feeling disenfranchised, and leaning toward leaving the Navy as opposed to staying in. These codes help to illuminate *dissatisfiers,* particularly when placed in context of the associated conversations, and they begin to point us toward aspects of Navy life and work that may merit attention.

Alternatively, other codes such as *enjoy, cyber, learning, fun* and *experience* are applied instead with aspects of Navy life and work that help to attract, interest and retain our participants, inducing them to lean more toward staying in the Navy than leaving it. These codes help to illuminate *motivators,* particularly when placed in context of the associated conversations, and they begin to point us toward aspects of Navy life and work that may merit broader replication.

Finally, *senior officer* is a code that is applied in two contrasting contexts. On one side, some participants refer to experiences with senior officers as highly enjoyable, educational and motivational. This is the case in particular where some kind of special relationship (e.g., working as an aide, having a mentor, being taught) emerges and corresponds generally with people who are leaning more toward staying in the Navy than leaving it. On the other side, however, some senior officers are perceived as unfair, aloof,

demonstrating overt favoritism, and evaluating people based on personality factors more than talent. This is the case in particular with participants who describe themselves as "quiet" yet "competent" and who are leaning more toward leaving the Navy than staying in.

Some additional codes, although appearing with less frequency than those summarized in the table, seem potentially very important also, particularly in the context of IWC talent and retention. Hence we pay attention to them as well.

3. IWC Constituencies

Beginning with a summary of the key codes from our interviews in Table 4, here we divide the IWC into two constituent parts or tribes, which we label "Cyber Warrior" and "Information Communicator." Note, these labels represent our interpretation, division and naming—not that of the study participants, IWC or Navy as a whole—based on coherence that we infer from the qualitative data. For instance, based on the interviews and our interpretation of the corresponding transcripts, we note a relatively coherent message, style and attitude from the 1810 (Cryptologic Warfare) and 1840 (Cyber Warfare Engineer) participants, which seem to differ qualitatively from that of their 1800 (Oceanography) and 1830 (Intelligence) counterparts.

The 1820 (Information Professional) participants, however, reflect many attributes and characteristics of both tribes, and although they do not fit neatly into either constituency, we view them as cohering more closely with the latter than the former. Thus, it is apparent that our division of the IWC into these two constituencies is rough and approximate, not exact and precise, yet we accept such roughness and imprecision for the insights enabled in this qualitative analysis. We leave any development of exact and precise groupings to future research.

Table 4. IWC Codes By Constituency

	Information Warrior						Information Communicator					
Code	**P1602**	**P1604**	**P1605**	**P1608**	**P1601**	**Subtotal**	**P1606**	**P1607**	**P1609**	**P1603**	**Subtotal**	**Delta**
	1810	1810	1810	1810	1840		1820	1820	1830	1800		
talent	2	2		1		5	1	2	2	1	6	1
technical	2	1	1	1		5	1	1	2		4	-1
cyber	2			1	1	4	1		3		4	0
unfair				1		1	2	2		2	6	5
fun	1	1			1	3	1		3		4	1
promotion	1	1				2	1	1		2	4	2
enjoy	1			2		3	1	1		1	3	0
no guidance	1	1	1	1		4		1			1	-3
people skill		1	1			2	1	1	1		3	1
learning		1	1			2		2	1		3	1
industry				1		1	2	1	1		4	3
transfer	2				1	3			1	1	2	-1
senior officer			1	1		2			1	2	3	1
opportunity	1	1		2		4					0	-4
experience	1		1	1		3		1			1	-2
command		2		2		4					0	-4
challenge			1			1	1	1	1		3	2
quality of life		1		2		3			1		1	-2
communication				1		1		1	1	1	3	2
solve problems		1				1			2	1	3	2
family		1				1	1		2		3	2
personality		1				1				2	2	1
milestone tour	1					1	1	1			2	1
school		1				1		1	1		2	1
busy	2					2			1		1	-1
money	1	1				2			1		1	-1
fit						0	1		2		3	3

As a differentiating example, the term *cyber* appears to be viewed inconsistently across the two tribes. For the first (i.e., 1810 & 1840), references to cyber and computer networks resembles that of a weapon. For instance, P1601 (Cyber Warfare Engineer) discusses an assignment in "the offensive operations arm of [Agency] … an organization that focused on high risk operations … projects that were deemed to be critical by the President and intelligence … postured to conduct computer network attacks when ordered." P1602 (Cryptologic Warfare) has a similar story: "I was assigned to [Agency] [Program] Operations where I served as a [leadership role] and ultimately [greater leadership role] for the Counterterrorism and [Country] mission sets. … Had direct impact daily."

Further, P1609 (Intelligence) expresses an interest in making a career pivot into cyber, moving out of intelligence, and hoping to work in the CNODP (computer network operations development program). This officer discusses an inherently better fit with the Cyber Warrior side, noting a "crypto and computer interest since childhood; born with video games; first computer at age 6." Although appreciative of the communicator role played through Intelligence, this officer sees a better job and career fit with cyber.

Nonetheless, the officer views intelligence as a vital, communication focused activity: A key aspect of talent involves one's ability to "communicate important information."

Even participants on the Cyber Warrior side express respect for and appreciation of the Communicator role. P1602 (Cryptologic Warfare) says that Oceanography officers onboard ship can complete (for rankings) effectively: "Officers are ranked across all IWC designators; METOCs, IPs, cryptos, intels all compete for CAPT/ADM rankings." When asked if some designators, like METOC for instance, are handicapped, this participant said, "No. Weather is important to CSGs [carrier strike groups]."

Others on the Information Communicator side emphasize the communication role also, yet they express frustration regarding resources being allocated to the Cyber Warrior side. P1606 (Information Professional), for instance, notes a "lack of emphasis on space billets" and claims that the IWC "views space as a collateral interest." P1603 (Oceanography) describes the METOC community's communicator role similarly.

P1608 (Information Professional) is even more emphatic: "Many leaders in the IP community seem as though they are either too focused on the new buzzwords of 'Cyber' … than they are on what actually makes the Navy run: Communications, both terrestrial and satellite. They don't seem to understand just how tedious, time consuming and difficult these actually are. The loss of an entire island's communications node is overlooked while a lost laptop is pored over." Likewise, "[Leader] cares more about the smallest cyber (non) issue than … about the largest, most damaging communications issue."

As accomplished for the IWC as a conglomerate above, in Table 4 we also tally code frequencies, but here we do so separately for the two constituencies. The respective subtotals are interesting separately, but we include a "Delta" column to highlight how some codes are applied more frequently for one tribe or another. For instance, the code *unfair* appears six times more often in the communication group than in its cyber counterpart, and coded comparisons with *industry* appear four times more often. Alternatively *command* is a code applied in the context of *opportunity* four times more often in the cyber group. Indeed, we do not see this code applied at all in such context to the communication group. These coding disparities appear to stem from *tribal* differences. We build further upon this interpretation in the section below.

C. SECOND ORDER ANALYSIS

In this section we summarize the second order analysis of our qualitative data. In the secondary stage, we treat first order codes and interpretations as "data" for second order analysis. This second order analysis augments its first order counterpart with theoretical insight and comparison, bringing in the investigator's perspective that is informed by the literature. We begin with second order code induction. Then we draw more deeply from the interview transcripts to flesh out each second order code further.

1. Second Order Code Induction

We begin by examining the codes from above. Iterating back and forth between each code and its context within the interview transcripts, we induce four second level codes (i.e., codes that summarize *in vivo* codes) and use them to help organize and cluster the first order codes: 1) *talent,* 2) *motivator*, 3) *dissatisfier* and 4) *tribal*. Regarding the first, given its central place in this study, we simply elevate *talent* to a second level code, and building upon first order codes, we induce *motivator, dissatisfier* and *tribal* as additional second level codes to help organize and cluster the data. Each of these second level codes is associated with all of their first order counterparts that apply, and the summary above is extended as such in Table 5.

Beginning with the talent code, for this technique, we simply mark an "x" in the "Talent" column for all first order codes that are associated in the contexts of our interview conversations. Within the first order codes shown here, we find nine associated with talent: *talent, technical, cyber, people skill, senior officer, experience, communication, personality,* and *fit*. Extending the list to the remaining codes not shown in this table, we also include *specialist, smart, performance, IT, get things done, leaving, knowledge, trust, results, respect, meritocracy,* and *competence.* Again, in the IWC officer participants' own words, these are the key codes used to interpret and characterize talent.

Table 5. Code Associations

Code	P1601	P1602	P1603	P1604	P1605	P1606	P1607	P1608	P1609	Total	Talent	Motivator	Dissatisfier	Tribal
talent		2	1	2		1	2	1	2	11	x			
technical		2		1	1	1	1	1	2	9	x			
cyber	1	2				1		1	3	8	x	x		
unfair			2			2	2	1		7			x	x
fun	1	1		1		1			3	7		x		
promotion		1	2	1		1	1			6			x	
enjoy		1	1			1	1	2		6		x		
no guidance		1		1	1		1	1		5			x	
people skill				1	1	1	1		1	5	x			
learning				1	1		2		1	5		x		
industry						2	1	1	1	5			x	x
transfer	1	2	1						1	5			x	
senior officer			2		1			1	1	5	x	x	x	
opportunity		1		1				2		4		x		x
experience		1			1		1	1		4	x			
command				2				2		4		x	x	x
challenge					1	1	1		1	4		x		
quality of life				1				2	1	4			x	
communication			1				1	1	1	4	x			
solve problems			1	1					2	4		x		
family				1		1			2	4			x	
personality			2	1						3	x		x	
milestone tour		1				1	1			3			x	
school				1			1		1	3			x	
busy		2							1	3		x	x	
money		1		1					1	3			x	
fit						1			2	3	x			

Likewise for *motivators*, in the table we find *cyber*, *fun*, *enjoy*, *learning*, *senior officer*, *opportunity*, *command*, *challenge*, *solve problems*, and *busy*. Extending the list to codes not shown in this table, we also include *service*, *sailors*, *pride*, *ops*, *impact*, *career*, *boss*, *adventure*, *pay*, *passion*, *interesting*, *independence*, *friendship*, *benefits*, *autonomy*, *rewarding*, *responsibility*, *pension*, *offensive*, *important*, *drive*, *clearance*, and *advancement*. Notice that some of the same first order codes appear in multiple second order columns; that is, a single first order code can associate with more than one second order, depending upon the context.

Further for *dissatisfiers*, in the table we find *unfair*, *promotion*, *no guidance*, *industry*, *transfer*, *senior officer*, *command*, *quality of life*, *family*, *personality*, *milestone tour*, *school*, *busy*, and *money*. Extending the list to codes not shown in this table, we also include *standards*, *specialist*, *OJT*, *NIOC*, *generalist*, *dissatisfaction*, *career*, *boss*, *billets*, *top down*, *status*, *retention*, *leaving*, *women*, *turnover*, *tribes*, *top heavy*, *seniority*, *resources*, *ranking*, *priority*, *leader*, *introvert*, *fitrep*, *exposure*, *cliques*, *breadth*, and *advancement*.

Finally for *tribal*, in the table we find *unfair*, *industry*, *opportunity*, and *command*. These stem from the differences noted above when comparing the Cyber Warrior and

Information Communicator tribes, and the constituent first order codes reflect differing emphasis across the tribes. In our analysis below, we also induce the tribal code *community image*, which we discuss there. Notice that three of the four first order tribal codes associate with *dissatisfier*. This suggests that differences across tribes may represent a source of dissatisfaction, a suggestion that we pursue further below.

Table 6. Second Order Codes and Associated First Orders

Second Order	**Associated First Orders**
Talent	*talent, technical, cyber, people skill, senior officer, experience, communication, personality, fit, specialist, smart, performance, IT, get things done, leaving, knowledge, trust, results, respect, meritocracy, competence*
Motivators	*cyber, fun, enjoy, learning, senior officer, opportunity, command, challenge, solve problems, busy, service, sailors, pride, ops, impact, career, boss, adventure, pay, passion, interesting, independence, friendship, benefits, autonomy, rewarding, responsibility, pension, offensive, important, drive, clearance, advancement*
Dissatisfiers	*unfair, promotion, no guidance, industry, transfer, senior officer, command, quality of life, family, personality, milestone tour, school, busy, money, standards, specialist, OJT, NIOC, generalist, dissatisfaction, career, boss, billets, top down, status, retention, leaving, women, turnover, tribes, top heavy, seniority, resources, ranking, priority, leader, introvert, fitrep, exposure, cliques, breadth, advancement*
Tribal	*unfair, industry, opportunity, command, community image*

This kind of analysis continues for additional codes that appear useful, interesting and informative, but instead of analyzing them all at once in a large batch process (e.g., developing all possible second order codes), we begin with these first four, continue with second order analysis, and then iterate back through the data, first order analysis and even follow-up interviews as necessary. We summarize the four second order codes and all associated first order codes (including *community image*) in Table 6. Although counts and frequencies are not central to qualitative analysis, we note that the number of terms used for the four second order codes *talent, motivators, dissatisfiers* and *tribal*, respectively, is 21, 33, 42 and 5. Although we certainly do not perceive our participants as a whiny group, they do mention several more dissatisfiers than motivators during the interviews. Their willingness to share dissatisfying as well as motivating stories and

experiences gives us confidence that participants value the anonymity of our study, which increases the credibility of their responses.

We continue by examining this table more closely, and although we apply our theoretical insight and comparison, the analysis remains grounded firmly in data. For ease of organization, we address each of the four second order codes from above in turn.

2. Talent

Starting with *talent*, we see 21 codes applied in the context of describing people with "talent," observations of "talent," and impressions of "talent." Additional context helps to flesh out the ideas. For instance, nearly every participant uses the term *technical* when discussing IWC talent.

When discussing offensive cyber operations, for instance, P1602 (Cryptologic Warfare) notes, "[there are] not many technically competent people in E7-9 ranks. [The] best people [are] working 70+ hours/week. Many do not (want to) promote to chief or are not interested in doing all of the non-work activities required. … Technical capability peaks at E6: This is the last rank where sailors advance based on ratings exam knowledge and where there is less emphasis on extracurricular/collateral duty jobs." In this domain, at least for the enlisted personnel, talent does not appear to correlate with rank; indeed, the opposite seems more apparent.

This participant goes on to characterize the most talented person in the group: "Cyber ops organizations are meritocracies [e.g., his team lead was E5]. … [Name] was the smartest guy in the room … best technical background, coded in high school, tinkered in the basement. … In the military, most of these people are enlisted: operators on the keyboard." He continues by saying that it is, "very hard to retain them. [Name] left for a contractor job at $150k salary and free education. … He went from E5/E6 and is now VP at [Company Name]." Here we see how talent in this context correlates with being a *specialist* at cyber operations, being *smart*, able to *get things done*, especially as "operators on the keyboard."

We learn also that *meritocracy* pertains to this environment, another indication that rank and talent are not tightly associated, and when probing to learn how this highly talented person acquired his ability, we learn that *knowledge* was developed long before

joining the military: “best technical background, coded in high school, tinkered in the basement.”

When asked more directly about talent, this participant adds that a talented officer is “smart; knows how to handle things; a high performer, early promote.” Here we see the term *smart* used again, and we see *performance* arise in the context of talent. When probed on what was meant by “smart,” this participant includes some characteristics: “GPA irrelevant; underlying intelligence; able to sift through many rules, regs and constraints; make IT work; get things done; think past SOPs (understand principles); push beyond training (creative).” Again, we see terms repeated (e.g., *get things done*), and we see *IT* [information technology] used to describe the specific class of *technology* that is key to talent in the IWC.

P1603 (Oceanography) echoes some of these same associations regarding talent, saying that it corresponds with being “knowledgeable and good at what they do,” repeating the *knowledge* connection but also bringing *competence* and *results* into view. Further, here we get the idea that “personality and mentoring” are associated with talent. Looking to the interview transcripts for additional context, we see that personality is associated with *fit*: “I’m kind of a quiet guy,” he says, adding, “most senior officers look for JOs who are self-promoting,” and then complaining, “talent doesn’t get recognized and rewarded.” We discuss this association between talent, recognition and reward in the dissatisfiers section below, but the implication is that people with talent are not necessarily the ones who garner rewards for it.

When asked to describe a “talented person,” this participant replies, “respect him as an officer; respect him as a person; not a careerist; just generally good at it.” Here we see the term *respect* (both professional and personal) used in connection with *talent*, in addition to another association with *competence*, saying this talented officer is “just generally good at it.”

P1604 (Cryptologic Warfare) offers a similar association between talent and technology, but adds two other components to the set: “Talent = technical competence + political sciences (world knowledge) + people skills.” Here we see *people skill* arise again, which this participant implies is important even for the stereotypic introvert that many people associate commonly with people who are technically competent with IT:

"Some people fill all buckets. Even some introverts know how to manage people." In identifying how talent is acquired, he says: "Components of talent can be taught and learned." The interview moves then into a story about a very talented CoS [Chief of Staff] who exemplifies this view of *talent*.

P1608 (Cryptologic Warfare) emphasizes communication also as a key component of talent, saying that "communication skills, working knowledge of job, and explaining technical stuff to senior officers" all contribute. P1609 (Intelligence) agrees with respect to the intelligence community, saying that talent involves being able to "communicate important information" in addition to "eloquence." However, we learn that talent along these lines can be misappropriated, saying that often, "the story is irrelevant. … A great speaker … uses a salesman's tactics to sell [an] idea even though the analysis may be flawed."

Other participants reinforce the importance of technical competence. P1605 (Cryptologic Warfare) offers, for instance, that a particularly "talented officer" has a "technical skill set [and] lots of experience," continuing, "computer, geeky, techie skill set." Describing further what talent looks like in a war zone, we learn that in "Afghanistan, talent equals technical competence." Interestingly, this participant admits to not possessing this same kind of technical talent yet remains highly motivated and optimistic, noting, "I have people skills … [Nick name] is the party planner."

P1606 (Information Professional) equates talent with "technical leadership." A talented officer "knows the details but can rise above them." He goes on to tell a story about a junior officer who exhibited considerable talent and leveraged the meritocratic nature of the organization. When a particularly troubling, technical problem affected the organization, everyone from the CO to deckplate technicians was involved with trying to solve it: "The JO told everyone to stop troubleshooting and to draw it on the white board instead." Apparently people listened to this junior officer, despite lower rank, and the problem was solved.

P1607 (Information Professional) describes a "very talented" friend and colleague who is leaving the Navy. This person has "the clearances, credentials and experiences to make him very valuable in industry." He goes on to confirm the importance of technical competence in terms of talent, but adds several other characteristics, including, "drive:

you want to be the best; set the new high bar … try to remain on par with civilians, but can never keep up; problem with generalization vs. specialization." This notion of specialization arises repeatedly through the interviews, particularly as a dissatisfier, for naval officers are rotated systematically through different jobs in order to promote breadth, but *technical competence*—a key component of *IWC talent*—appears to demand specialization.

P1602 (Cryptologic Warfare) agrees: "Trust is critical in this domain. Organizations have very short memories and extremely high turnover. You must stay current to remain good. These are very perishable skills, especially in an operational environment. One year away and you're worthless!" Here too we find *trust* arising as a component of talent, particularly trust in one's technical competence and ability to get things done.

To round out our discussion on talent, P1609 (Intelligence) is one who is making a career pivot, studying Cyber Systems Operations and hoping to get a cyber job after completing degree work at the NPS. As such, and in contrast with the importance of *communication* in terms of talent in the intelligence domain, when describing "talented people" in the cyber domain, we see a number of characteristics: "creativity; open minded; long multicolor hair and tattoos; countercultural; innovative; think outside box; challenge dogmatic ideas; explore fringe ideas; software developers; develop tools; go beyond training; stumble across successes; logical analysis; defeating others' systems; interdisciplinary." Note that this same participant characterizes talent in the intelligence domain differently than in the cyber domain. This gives much credence to the idea that *talent* likely differs even across IWC areas and is likely to be highly situated (e.g., dependent upon one's job assignment) and nuanced (e.g., sometimes favoring technical competence and achieving results, other times favoring communication and people skills).

To summarize, IWC talent appears to have a strong rooting in (IT) technical competence. However, it does not appear to correlate with rank—at least from the perspective of these (O3 & O4) participants. Indeed, beyond a certain point, there appears to be an inverse correlation between rank and what our IWC participants view as talent. Technical competence is a central root of IWC talent that renders many operational

organizations into meritocracies, where the person best able to solve problems is encouraged and permitted to lead. Interestingly, our Strategic Contact likens this to SEAL and other special forces teams.

This technical competence root of talent appears further to require considerable specialization, in addition to intelligence and experience, in order to get things done. Knowledge—much of it acquired before military service, but the rest learned principally on the job—is central to technical competence. This applies particularly as knowledge pertains to IT, but working effectively within a situated organization and environment appears to be important too, as talented people are able to sift through rules and constraints, think past SOPs, push beyond training, and be creative, all the while fitting in. Additionally, talent appears to involve people skills and communication also, with the ability to lead technical workers important in many officer contexts. This requires trust, and it appears that the most talented people in the IWC may not be the same ones who (are motivated to) emerge as IWC leaders.

3. Motivators

Continuing with *motivators*, we see 33 codes applied in the context of describing people who are "motivated," observations of "motivation," and impressions of likely "retention." Additional context helps to flesh out the ideas. For instance, nearly every participant uses the term *enjoy* or *fun* as an IWC motivator.

When discussing what motivates talented people to stay in the Navy, for instance, P1606 (Information Professional) says that he and others "enjoy the work." This participant includes a number of other motivators: "people you work with; shared suffering; strong bond and friendships (awesome); lead great sailors; see and help them improve; honor to serve and lead them; pay and benefits are good." Here we see *friendship*, leadership of *sailors*, and *service* mentioned.

Notice that we see *pay* and *benefits* included as motivators too. P1603 (Oceanography) offers a similar comment regarding "pension and guaranteed income." This strikes something of a contrast with some of the comments from above regarding talent. In that previous (cyber) context, military pay is viewed as inadequate to retain the most talented people, but here (with an Information Professional) we find pay as a motivator. This may suggest additional differences and nuances between IWC tribes,

through which retention measures may necessarily have to differ from one designator or tribe to another.

P1605 is especially enthusiastic: "Everything pulls me with regards to staying in the Navy! The people, the camaraderie, the pay, the benefits, flexible schedule, time off, discipline, the environment, the change of duty stations every two to three years. … Additionally, I don't know what job in the civilian world would give the pay, benefits and flexibility that I have in the Navy. I don't think there's a job out there that I would enjoy as much as I do with the Navy." Nonetheless, this unmarried participant notes a relationship cost: "The only thing that would really pull me away from the Navy is the lack of a steady relationship. With being in a highly mobile career and a strong independent type A [gender], I find it rather hard to meet [opposite gender] of the same caliber that would want to commit in a relationship given my ever changing and moving job."

P1608 (Cryptologic Warfare) mentions enjoyment also. Here it is more in the context of *opportunity*, and this prior enlisted participant appreciates in particular opportunity in terms of education and living abroad. In contrast, this same participant describes having to relocate frequently as a *quality of life* issue, so it's unclear whether travel is a net positive or negative. P1609 (Intelligence) mentions enjoyment as a motivator also, noting in particular "freedom to explore and do what they enjoy." The context of this statement suggests that *independence* and *autonomy* are important contributors to enjoyment.

P1602 (Cryptologic Warfare) discusses enjoyment as well: "I enjoy the challenge and the ability to have an impact, whether at the tactical or strategic level in the defense of the nation." Here we find *challenge* as a motivator, especially where this participant could have *impact*, and P1601 (Cyber Warfare Engineer) notes how in the cyber domain it is "fun to conduct ops," particularly in *offensive cyber ops*. Interestingly, both P1601 and P1602 exhibit considerable *pride* when discussing their cyber jobs, characterizing them more in terms of *adventure* than work, and P1606 (Information Professional) even mentions *passion* with work: "space is a passionate pursuit." This participant adds quickly some disappointment, however, that "space does not receive priority." It seems

that the motivational effect of job enjoyment can be countered by the inability of talented people to pursue their passions.

Other, similar motivators emerge from the interviews. P1605 (Cryptologic Warfare) notes how at every duty station, this participant will "take on new challenges, risks, and learn something new. There's nothing at this moment that I necessarily dislike about my work." It seems clear that *learning* is important, and this person appears to be satisfied with the job. P1603 (Oceanography) discusses how *interesting* work is an important motivator and how it appears to contrast with advancement: "leaders [are] not doing interesting work; not focusing on important work." P1608 (Cryptologic Warfare) adds that the "technical aspect of the job is interesting," and P1609 (Intelligence) follows suit, saying how a "Cyber job would be exciting … especially CNODP [computer network operations development program would be] very interesting! I want to steer toward that job!"

Related perhaps to enjoyment and fun, we also find participants discussing motivators in terms of *rewarding* work. For instance, P1602 (Cryptologic Warfare) describes his cyber operations assignment with [Agency] as the "most rewarding tour of my career!" Continuing with enthusiasm, this participant was also "very busy; always on call." Despite being *busy*, this participant enjoyed considerable *responsibility* and did not seem to mind the long hours and frequent trips at night and on weekends into the classified spaces.

Related perhaps also to enjoyment and fun, we find the ability to *solve problems*. P1603 (Oceanography), for instance, notes regarding motivating factors how this participant enjoys the opportunity to "solve problems in the organization." This officer provides additional insight regarding retention: "staying in is easy; getting out and transitioning is hard." Apparently, overcoming career switching costs represents a (probably inadvertent) motivator that helps to retain talent.

P1604 (Cryptologic Warfare) echoes the problem solving motivator: "I like building a team to solve a problem. I've been lucky in being placed in positions, and having the support of great bosses, where I've been able to build my team and solve major problems or fill key intelligence gaps." Here we see how one's *boss*, a more *senior officer*, can also exert a motivational effect on job enjoyment and talent retention. P1605

(Cryptologic Warfare) goes further to note how some senior officers have provided very strong motivation via "Mentorship – positive influence from some senior officers."

Finally, *career* and *advancement* are on the minds of most participants. P1606 (Information Professional) notes: "I'll do everything I can to be the next CNO; 100% dedicated to my career." P1602 (Cryptologic Warfare) adds: "Unless something significant occurs, I will make the Navy a career (at least until 21 years); after that I will need to re-evaluate the work, my potential career path (which is somewhat unclear) and family considerations." Most participants mention an interest in *command*, and they exhibit considerable *drive*. As we note in the next subsection, however, such drive toward command represents a metaphoric two-edge sword: On the one edge, it is highly motivational, but on the other, lack of command opportunities represents a source of frustration and dissatisfaction in the IWC.

To summarize, enjoyment of one's work, having fun on the job, making friendships, leading and mentoring sailors, serving one's country and shipmates, and being passionate about what one does: These all serve as motivators that help to retain talent. Independence and autonomy are positive motivators also, as are challenge and the ability to have impact. Likewise, learning is important to most participants, as is problem solving, and having interesting and rewarding work is viewed quite favorably, even when people remain very busy and work very hard.

Further, we find that pay and benefits serve as motivators for some, but others complain that the civilian sector offers much better pay and benefits. This may reflect some differences between IWC tribes. Likewise some participants note the adventure, changing jobs and locations, and learning something new every few years as motivational—particularly where more-senior officers provide mentorship and positive leadership—whereas others complain about job rotation frustrating their ability to specialize and pursue their passions, in addition to the disruption of family life by having to deploy and move frequently. Although the career switching costs appear to represent a (probably inadvertent) motivator that helps to retain talent, several participants complain about not being able to pursue their passions, about not being able to specialize and continue in jobs that they enjoy, and about quality of life issues that reduce motivation.

Additionally, more-senior officers—through their impact on both enjoyment and command opportunities—appear to play a major role in terms of motivation (and dissatisfaction). Mentorship and making a work environment enjoyable and rewarding exert a very positive motivational influence. Alternatively, bosses who exhibit favoritism, who create a toxic work environment, and who limit opportunities for good experiences that enhance one's chances of attaining command one day represent a major source of dissatisfaction, which we describe next.

4. Dissatisfiers

Continuing with *dissatisfiers*, we see 42 codes applied in the context of describing people who are "dissatisfied," observations of "disappointment," and impressions of unlikely "retention." Additional context helps to flesh out the ideas. Even more so than with the second order codes above, *dissatisfiers* appear to apply inconsistently across the IWC. Indeed, sources of dissatisfaction—and the corresponding likelihood of leaving the Navy—differ across tribes.

To summarize at a high level, although those in the Cyber Warrior Tribe appear generally to enjoy what they do, many express dissatisfaction with having to leave fun jobs and serve in other roles. Alternatively, although many in the Information Communicator Tribe also express dissatisfaction with the need to rotate out of jobs that they are passionate about, a major source of frustration stems from what they view as an unfair bias against them. Quality of life issues emerge of course, and many participants compare their military jobs, careers and lives with counterparts in the civilian world. We begin with the cyber warriors and then discuss their information communicator counterparts.

As noted above, many cyber warriors appear to find particular reward, satisfaction and enjoyment in their work. As noted above also, however, the allure of civilian jobs is powerful, particularly where talented people can have opportunities to continue in cyber and like jobs that they enjoy. Hence having to rotate out of fun jobs represents a major source of dissatisfaction and a high retention risk. P1601 (Cyber Warfare Engineer), for instance, indicates a high likelihood of leaving the Service because of dissatisfiers. For one, this participant's next tour will not involve cyber operations, but for another, this talented officer complains about bureaucracy and people who are afraid to make

important decisions: "I am tired of the situations that I explained [above]. I know they exist in the civilian world, but I will be paid better there [in the civilian sector]."

P1602 (Cryptologic Warfare) agrees, adding that rotation is a big problem: "people can't stay and do a job they enjoy forever. … They're expected to move around, gain breadth. … The smartest cyber operator we had was sent to a DDG. … These people can earn nine times the money outside in industry: banks, security firms, government contractors, SCADA control, etc. … [It's problematic to] transfer people out of fun jobs. … There's huge demand for their skills."

P1608 (Cryptologic Warfare) piles on, noting, "big civilian needs [for people with] IT experience and acquisition experience," adding that "banking is calling for cybers," and explaining how, "sea tours are all staff jobs, lots of work, staying late, low quality of life." P1601 (Cyber Warfare Engineer) adds that "people want to be attached to operational (cyber) units." P1602 (Cryptologic Warfare) agrees, saying that "people like cyber."

Further, because of high classification levels and highly compartmentalized information, the people who were responsible for P1601 (Cyber Warfare Engineer) administratively were not the same ones he was responsible to operationally. This created tension, for the people he worked for operationally found it difficult to reward good performance, and those who could reward such performance were unable to learn about it.

Although not limited to this IWC tribe, participants also complain about lack of opportunity for promotion, advancement and command. P1602 (Cryptologic Warfare), for instance, emphasizes problems with milestone tours: "O4 milestone tour can be problematic. 280 O4s competing for only 60 milestone tour billets. 1810 milestones differ from those needed by 1820s. Selections are made based on performance and/or experience; ideally you want both, but sometimes one is more compelling." Given the importance of milestone tours in the IWC, this appears to be a structural retention filter, but it is unclear whether it represents a deliberate or unintentional one.

P1604 (Cryptologic Warfare) agrees but focuses attention more on limited opportunities for command: "The Navy needs to take a bottom up and top down view of manpower. DDG & LCS are both command jobs, but one involves many more people

than the other. 1810 magnet sites (NIOCs) are run by O6s and have 1000 – 2000 people; [the IWC] should be able to break them up and offer more command opportunities." This and other participants note how many of their SWO (Surface Warfare Officer) counterparts will have command jobs at O5. Having the rank "Commander" without an opportunity for command seems frustrating to them.

P1608 (Cryptologic Warfare) makes the same point: "Now that I have been in for a while I noticed that there is not really that much room for growth in my community. What I mean by 'growth' is not much opportunity for command. My goal since I was commissioned has always been to command, and looking at the numbers, the odds are stacked against everyone." This officer adds, moreover: "Command opportunities are decreasing due to base consolidation." In order for this officer "to stay in … [the IWC would have to] increase CO opportunities, break up NIOCs, and increase the number of COs." Further, this participant echoes a sentiment from above: "Working long hours on staff tours is not worth the effort," adding that "SWOs [are] getting XO & CO jobs at O4 & O5." Here we see further how participants in the IWC—a great many of whom transferred laterally from the SWO and other warfare communities—compare themselves with peers in other communities. In this case, the IWC officers appear to feel disadvantaged.

Not everyone agrees, however. P1604 (Cryptologic Warfare) says, for instance: "Getting results is more important than promotion." This officer adds: "The Navy is not going to make me a flag officer." "I'm not good at writing. Can't keep my mouth shut."

Another element of dissatisfaction centers on the career path and expectations within the IWC. As with the discussion above of limited opportunity for promotion, advancement and command, this element is not limited to the Cyber Warrior Tribe either. P1604 (Cryptologic Warfare) adds to the comments above: "18xx has no golden path to advancement. Contrast SWO community: 100% command opportunity." P1605 (Cryptologic Warfare) agrees, adding: "Career roadmap is missing (e.g., ship tour, NPS, etc.); getting fuzzy; lots of growth and change in community; hard to know what to do next." P1608 confirms, saying that "career progression is unstructured and unclear."

Finally, we come to quality of life, which is not a new issue with the Navy, nor is it limited to either IWC. Some accept the sacrifice, and others do not. Here are some

thoughts from those in the Cyber Warrior Tribe. P1608 (Cryptologic Warfare), says, for instance: “The opportunity in the civilian world is great for experienced Cryptologic Warfare Officers; six-figure salary; M-F day job; no worry about uprooting the family; no worry about missing birthdays, holidays, or special occasions; etc.” P1604 (Cryptologic Warfare) agrees, describing this participant’s previous decision to leave the “Nuclear Navy,” “turned down a $250k nuke bonus,” saying it was “not enough to keep me in; missed daughter’s first birthday; quality of life is important.” P1609 (Intelligence), who is working to pivot toward cyber jobs, echoes this sentiment: “I don’t want to be deployed and away from family.”

Many of these same sentiments are echoed by participants from the Information Communicator Tribe, so we do not repeat them here. Rather, we focus on differences between dissatisfiers across the two tribes. For one, several report what they perceive to be an unfair bias against them. P1606 (Information Professional) says, for instance, “IWs [Cryptologic Warfare officers] have high status because of the cyber mission, especially those on the offensive side. IPs are largely shut out of cyber.” Hence the inability to work in cyber jobs is dissatisfying and seemingly unfair to this participant.

P1607 (Information Professional) has similar comments: “The IWC is giving away ‘our’ billets to cryptos [Cryptologic Warfare officers].” Also, this participant adds: “Coms jobs are seen as routine. … This is a negative sum community. … After a certain rank, one stops getting challenged; jobs become boring. … I had to fight for my sea tour.” There appears to be a perceived status gap between cyber warriors and information communicators that is dissatisfying to some in the latter tribe. This officer adds: “Cryptos [Cryptologic Warfare officers] are getting all the attention. Cyber gets all the attention. … We IPs [Information Professionals] … feel like second class citizens. O6 jobs are going to cryptos.” Despite this dissatisfier, the officer adds: “I don’t mind being a support member.” As Rodney Dangerfield might have said, “I get no respect” (Dangerfield, 2016).

Also, similar to the issue noted above of having to rotate out of enjoyable cyber jobs, some information communicators are dissatisfied with having to generalize and gain breadth through job assignments. It seems that many would prefer to specialize instead. P1603 (Oceanography), for instance, earned a PhD but complains about the unfairness of

people without PhDs getting D-coded billets (i.e., jobs specified for PhDs). This officer is required to work in jobs that do not leverage the considerable education paid for and provided by the Navy, which is dissatisfying. P1606 (Information Professional) complains similarly about a lack of opportunities, saying there are "more opportunities for some professionals than others," and arguing that there is "opportunity for better fit as an SME [subject matter expert] vs generalist." As noted above, space is a passion for this information professional, but the lack of opportunities to work in space jobs is dissatisfying.

P1609 (Intelligence) is dissatisfied with job opportunities also, but this participant's perception of unfairness focuses on recruiters and detailers. "Recruiting is a flawed process. Recruiters redirect people into jobs to be filled instead of making good matches." This participant—a high GPA, technology oriented, math and philosophy major in college, with crypto and computer interest since childhood—repeatedly sought technology jobs but was offered only intelligence work. As a result, this participant "might get out after the payback tour." "Intel is not what I thought," he adds. This officer explains why many intelligence officers choose to stay in the Navy: "job security; fear of the unknown; sustain them financially; gives them meaning through community; small community; networking is big; socially motivated; brotherhood; overall people choose to stay." Nonetheless, without an opportunity to transition into a cyber job, this professional is unlikely to be one of them to stay in the Navy.

5. Tribal

Finally, we return to tribal differences, most of which we articulate among the dissatisfiers above. We recapitulate and summarize them briefly here as well, but it is important to recall how our grouping of participants into these two tribes is rough and approximate, not exact and precise. The 1820 (Information Professional) participants, for instance, reflect many attributes and characteristics of both tribes, and hence do not fit neatly into either. Nonetheless, we accept such roughness and imprecision for the insights enabled in this qualitative analysis, and we leave any development of exact and precise groupings to future research.

First, we identify *unfair* as a tribal difference in terms of perception. Indeed, among the four codes leading to induction of *tribal* as a second order, *unfair* is applied

most often. We note above, for instance, how some information communicators perceive an unfair bias against them (e.g., being shut out of cyber, losing billets to cyber), and, as another instance, how one participant perceives injustice with D-coded billets being given to people without PhDs. As a third instance, an intelligence officer perceives a lack of fairness in the recruiting process.

This perceived unfairness arises in other contexts as well. P1603 (Oceanography), for instance, perceives the promotion and advancement process as biased. In a story about a "talented officer who left the Navy," we learn: "He got out. He was doing well, but he knew that the person ahead of him in terms of seniority would get the good ranking, regardless of how well he performed. He saw the advancement system as unfair: timing and seniority are more important than talent." Apparently this talented officer "talked about this extensively," and our participant adds that "it's tacitly understood by everyone that whoever's up next for promotion is going to get the 'good' FITREP."

We note above also about how *industry* is a differential code across tribes. This pertains mostly to competition for talent, and although the cyber warriors discuss the allure of industry opportunities considerably, their information communicator counterparts mention industry much more concretely. In other words, whereas the former officers appear more to be thinking about leaving the Navy because of opportunities in industry, the latter officers appear more to be thinking about leaving because of dissatisfiers in the Navy. This links directly to the code *opportunity*. Those in the Cyber Warrior Tribe see much greater opportunity, both within the Navy and beyond, than their communicator counterparts do. Nonetheless, these same cyber warriors complain still about the lack of opportunity for *command*.

Finally, although this issue is not between the different *IWC* tribes per se, it arises as IWC participants compare themselves to other warfare communities *beyond the IWC*. This pertains in particular to SWOs (Surface Warfare Officers) and in the contexts of both command opportunities and career guidance. We induce the new code *community image* to characterize this issue.

D. SUMMARY DISCUSSION

In this section we summarize, synthesize and integrate our findings from above. We begin by building upon the qualitative data analysis pertaining to talent in the IWC, for this informs the first part of our research question directly: What constitutes talent in the IWC? We build then upon analysis pertaining to motivators and dissatisfiers, for this informs the second part of our research question: Why do some talented people choose to leave the Navy while others choose to stay in? Because the reasons for staying and leaving differ somewhat across IWC tribes, we integrate tribal analysis throughout this discussion. We turn then to the third part of our research question: How can we retain talent in the Navy? The short answer is to a) identify and reward talented people; and *for them* b) emphasize motivators and mitigate dissatisfiers. We finish this section with a short set of recommendations to address each significant retention risk identified through this analysis.

1. Talent

What constitutes talent in the IWC? For reference we recapitulate our summary interpretation of IWC talent through second order analysis from above.

IWC talent appears to have a strong rooting in (IT) technical competence. However, it does not appear to correlate with rank—at least from the perspective of these (O3 & O4) participants. Indeed, beyond a certain point, there appears to be an inverse correlation between rank and what our IWC participants view as talent. Technical competence as a central root of IWC talent renders many operational organizations into meritocracies, where the person best able to solve problems is encouraged and permitted to lead. Interestingly, our Strategic Contact likens this to SEAL and other special forces teams.

This technical competence root of talent appears further to require considerable specialization, in addition to intelligence and experience, in order to get things done. Knowledge—much of it acquired before military service, but the rest learned principally on the job—is central to technical competence. This applies particularly as knowledge pertains to IT, but working effectively within a situated organization and environment appears to be important too, as talented people are able to sift through rules and constraints, think past SOPs, push beyond training, and be creative, all the while fitting in. Additionally, talent appears to involve people skills and communication also, with the ability to lead technical workers important in many organization contexts. This requires trust, as well as technological currency, and it appears that the most talented people in the IWC may not be the same ones who (are motivated to) emerge as IWC leaders.

For the IWC as a whole, *knowledge* appears to drive most characterizations of talent. Technical knowledge is required for technical competence, which represents a

central root of IWC talent. Hence our grounded understanding of *IWC talent* must begin with technical knowledge. However, such knowledge is not unidimensional and centered solely on technical competence. Rather, technical knowledge and competence are situated within technical organizations where people are required to lead, communicate and fit in. This situated nature of knowledge varies a bit across IWC tribes.

For the cyber tribe, for instance, other kinds of knowledge such as world understanding, people skills and communication are noted as important, but they do not appear to be commensurate with technical knowledge and "smart" people's ability to "get things done" within cyberspace. In many respects, this central technical knowledge begins developing long before talented people enter the Navy, and hence this might represent an important characteristic for recruiters and detailers to examine. Notwithstanding the other, arguably important knowledge aspects of IWC talent, our interpretation is that technical cyberspace knowledge is central to talent in the Cyber Warrior Tribe.

For the communicator tribe, as a complementary instance, the other kinds of knowledge noted above appear to be more prominent and hence important. Technical competence is central nonetheless, but perhaps not as singly so as in the cyber tribe, and it focuses more on information support systems than cyberspace per se. This represents one of the drivers for us to name this tribe "Information Communicator": Communication and associated skills appear to have greater importance than in the cyber tribe.

So what constitutes talent in the IWC? IT technical knowledge and the competence that it enables are fundamental, but we find nuanced differences between the cyber and communicator tribes. For the cyber warriors, IT technical knowledge and the ability to take effective actions within cyberspace are central to talent. For the communicators, technical system knowledge and the ability to communicate within the organization are key. For both tribes, talent does not appear to correlate positively with rank.

2. Motivators and Dissatisfiers

Why do some talented people choose to leave the Navy while others choose to stay in? For reference we recapitulate our summary interpretation of IWC motivators and dissatisfiers through second order analysis from above.

In terms of motivators, the enjoyment of one's work, having fun on the job, making friendships, leading and mentoring sailors, serving one's country and shipmates, and being passionate about what one does: These all serve as motivators that help to retain talent. Independence and autonomy are positive motivators also, as are challenge and the ability to have impact. Likewise, learning is important to most participants, as is problem solving, and having interesting and rewarding work is viewed quite favorably, even when people remain very busy and work very hard.

Further, we find that pay and benefits serve as motivators for some, but others complain that the civilian sector offers much better pay and benefits. This may reflect some differences between IWC tribes. Likewise some participants note the adventure, changing jobs and locations, and learning something new every few years as motivational—particularly where more-senior officers provide mentorship and positive leadership—whereas others complain about job rotation frustrating their ability to specialize and pursue their passions, in addition to the disruption of family life by having to deploy and move frequently. Although the career switching costs appear to represent a (probably inadvertent) motivator that helps to retain talent, several participants complain about not being able to pursue their passions, about not being able to specialize and continue in jobs that they enjoy, and about quality of life issues that reduce motivation.

Finally, more-senior officers—through their impact on both enjoyment and command opportunities—appear to play a major role in terms of motivation (and dissatisfaction). Mentorship and making a work environment enjoyable and rewarding exerts a very positive motivational influence. Alternatively, bosses who exhibit favoritism, who create a toxic work environment, and who limit opportunities for good experiences that enhance one's chances of attaining command one day represent a major source of dissatisfaction, which we describe next.

In terms of dissatisfiers, although those in the Cyber Warrior Tribe appear generally to enjoy what they do, many express dissatisfaction with having to leave fun jobs and serve in other roles. Alternatively, although many in the Information Communicator Tribe also express dissatisfaction with the need to rotate out of jobs that they are passionate about, a major source of frustration stems from what they view as an unfair bias against them. Quality of life issues emerge of course, and many participants compare their military jobs, careers and lives with counterparts in the civilian world.

Motivators are relatively consistent across the IWC as a whole, as the enjoyment of one's work seems paramount. Such enjoyment appears to be even more pronounced within the Cyber Warrior Tribe, however, as we detect levels of enthusiasm and feelings of adventure greater among cyber warriors than information communicators. Hence they may enjoy their jobs more, and this helps to set up the corresponding dissatisfier: rotation. In other words, since these cyber warriors appear to enjoy their cyber jobs so much—and they express a strong desire to specialize and continue working cyber jobs—even a standard rotation is viewed negatively. This strikes us as a significant retention

risk, particularly given the demand for their knowledge and experience in the civilian sector.

Participants within the Information Communicator Tribe appear to enjoy their work as well, but it is not as pronounced. Leadership and friendship, in addition to pay and benefits, appear to be more motivational to communicators, but some echo the cyber warriors' dissatisfaction with rotation. Indeed, for participants in space and oceanography, for two instances, the opportunity to specialize would be viewed very positively, whereas the need to generalize is viewed negatively. As one participant notes, "the Navy is not going to make me a flag officer." For some talented participants—who are not focused solely upon promotion and advancement—forcing them to generalize appears to be highly dissatisfying. This strikes us as another significant retention risk, particularly given the demand for their knowledge and experience in the civilian sector.

We must note also how command and opportunity for advancement arises as both motivator and dissatisfier. In terms of motivation, many IWC participants—regardless of tribe—comment on how they seek command, yet most participants complain about the relative dearth of command opportunities, coupled with a comparative lack of career guidance. This is the case in particular as participants compare themselves with peers in the SWO and other communities, for this affects their community image. As talented people promote and compete for limited milestone and command jobs (esp. at O5 and even more so at O6), unless the enjoyment of one's job can overcome the frustration with lack of advancement opportunities, we see a significant retention risk, particularly given the demand for their knowledge and experience in the civilian sector.

Many participants, across both tribes, view their relationships with more-senior officers as highly important, and the nature of such relationships can be motivational or dissatisfying. It is difficult to assess how many "good" motivational bosses it might take to overcome the dissatisfaction of one "bad" one, or vice versa, but it seems that if participants are exposed repeatedly to dissatisfactory experiences induced by toxic leadership, then this will lead them to leave the Navy. This strikes us as a significant retention risk, to the extent that talented people are exposed repeatedly to bad bosses. Alternatively, this strikes us also as a significant retention motivator, to the extent that talented people are exposed repeatedly to good ones.

Finally, the familiar quality of life issues impact retention clearly. This is not a new story, but when talented people compare their quality of life in the Navy with what they could experience in the civilian sector, it represents a retention issue meriting ongoing study and consideration, particularly given the demand for IWC knowledge and experience in the civilian sector.

So why do some talented people choose to leave the Navy while others choose to stay in? The enjoyment of one's work is paramount, but we find nuanced differences between the cyber and communicator tribes. For the cyber warriors, who appear to enjoy their cyber jobs especially much, being able to specialize and continue with cyber jobs seems likely to keep them in the Navy, whereas the requirement to generalize and rotate into less enjoyable jobs seems likely instead to push them into the civilian sector. For the communicators, the opportunity to either specialize or reach command seems key to keeping them in the Navy, whereas if unable to do either, they seem likely instead to leave for civilian jobs. For both tribes, situated characteristics such as motivational versus toxic leaders and quality of life issues must balance with other motivational and dissatisfying factors.

To summarize, we identify the four significant retention risks listed in Table 7.

Table 7. Significant Retention Risks

Retention Risk	**Vulnerable Population**
Rotation out of cyber jobs	Cyber warriors
Generalization through job breadth	Information communicators
Dearth of command opportunities	All IWC
Repeated exposure to toxic leaders	All IWC

3. Talent Retention

How can we retain talent in the Navy? The short answer is to a) identify and reward talented people; and *for them* b) emphasize motivators and mitigate dissatisfiers. Far from a glib response, we offer this sincerely and as a direct outcome of the preceding discussion. Through this study, we understand better now what constitutes talent in the IWC, and we see how it varies across tribes. This should enable us to identify talented IWC officers more easily, and hence to assess the relative retention risks associated with these talented people. Further, we also understand better the most important motivators

and dissatisfiers for IWC officers, which we can interrelate to both significant retention risk and vulnerable population. Thus, where we find talent and retention risk, we should act.

4. Recommendations

So what should we do? Our recommendations address each retention risk in turn. First, regarding the risk stemming from rotating cyber warriors out of cyber jobs, we could consider an alternate career path for talented officers who do not seek command. This could potentially be set up as a deliberate choice that a talented officer is allowed to make, through which he or she expressly indicates disinterest in command and accepts the likely result that O4 or O5 will be the highest rank achievable. In return, such officers would be permitted to "homestead" in cyber jobs—perhaps rotating across *cyber* billets—for the balance of their careers[3]. This could have three beneficial effects: 1) such homesteaded cyber officers would develop greater cyber knowledge, skill and experience; 2) the Navy would increase its ability to retain these talented people; and 3) the limited number of milestone and command billets—which represents another retention risk—would face less competition. Of course, much work would be required to implement a plan along these lines, and it is unclear what impact it would have upon the detailing process, but it could potentially help to keep talented information warriors from leaving the Navy.

Our recommendation to address the second significant retention risk is similar. The only difference is that talented people who would prefer to become SMEs in some relatively narrow area (e.g., concentrate on space) outside of cyber would be permitted to make a deliberate choice to specialize and give up command opportunities. Indeed, our recommendation addressing cyber warriors above could be subsumed effectively into this idea, but clearly all of the same implementation details and unclear impacts would apply. As a note, in this study we look only at the IWC, but if other Navy warfare communities experience similar issues, then the kinds of recommendations proposed here could offer

[33] Although this recommendation emerges through analysis of cyber warriors, it could potentially be applied broadly to other IWC tribes, and perhaps to other warfare communities across the Navy. The issue centers on how people's job enjoyment contributes positively to their decisions to stay in the Navy. If talented people—even beyond the IWC—are given the option of "homesteading" in jobs that they enjoy, then they might become more likely to stay.

potential to address retention risks throughout the Navy. We leave this as a topic for future research.

Third, regarding the risk stemming from the dearth of command opportunities, the recommendations above (i.e., an alternate career path for talented officers who do not seek command) could potentially limit competition for the limited number of milestone and command billets that are available. Moreover, we could look further at the number of people associated with various commands and consider breaking some very large commands into smaller parts. This could accommodate more officers seeking command. A related issue pertains to what some IWC participants view as unclear career guidance and pathways. We're uncertain whether such participants simply do not understand the career progression—which implies that IWC leaders should endeavor to elaborate and explain it more clearly—or whether the relatively inchoate IWC could benefit from a more detailed and standardized career roadmap, similar to those enjoyed by SWOs, aviators and officers in other warfare communities. We leave this as a topic for future research also.

Finally, regarding the risk stemming from repeated exposure to toxic leaders, command climate surveys represent a good start to identifying leaders who dissatisfy people in their organizations, and perhaps a portion of every leader's fitness report should include a specific element to summarize command climate survey results. This is very similar to how university professors are evaluated in terms of teaching: Professors assign grades to students based upon their performance on exams and other coursework, but students also assign course evaluations to professors based on *their perceptions* of teaching efficacy. Additionally, since we seek to focus in particular upon *talented* IWC personnel, once they have been identified, perhaps we could explore avenues for giving them access to more-senior officers above their direct superiors. Although this risks interrupting the unitary chain of command in some respects, such access could be limited only to infrequent and important issues (e.g., career guidance, extreme grievance). The idea is to address and correct toxic leadership before it can dissatisfy a multitude of talented people.

V. CONCLUSION

The Navy Information Warfare Community (IWC) provides a vital, sophisticated capability to address increasingly dynamic and unpredictable threats around the world. The problem is, the same skills and capabilities that make IWC personnel so valuable to the Navy also make them valuable to myriad firms in industry and organizations elsewhere beyond the Services. Moreover, such skills and capabilities are *directly transferrable* to industry. As a result, many talented information warriors are leaving the Service at the midpoints of their military careers. Indeed, nearly half of our study participants indicate that they are likely to leave the Service when the next opportunity arises.

Further, unlike other Navy communities (e.g., Aviation, Nuclear), in which clear career guidance and well-established incentives (e.g., bonus and retention pay) are in place, the comparatively inchoate IWC does not appear to benefit similarly. A number of our IWC participants indicate that career guidance is inadequate, for instance, and some remain uncertain what to do next. Alternatively, other participants appear to understand what needs to be done next, but they express frustration at the limited number of opportunities for milestone tours and command.

Given the unique nature of the IWC, it has not been entirely clear what "talent" means in this community. Through this study, however, we describe how *talent* is a highly situated and nuanced concept—far from general and monolithic—that is aligned with a person's knowledge and capability within an organization setting. Indeed, we identify what constitutes talent in the IWC: IT technical knowledge and the competence that it enables are fundamental, but we find nuanced differences between the cyber and communicator tribes. For the cyber warriors, IT technical knowledge and the ability to take effective actions within cyberspace are central to talent. For the information communicators, technical system knowledge and the ability to communicate within the organization are key. For both tribes, talent does not appear to correlate positively with rank.

Moreover, we articulate why some talented people choose to leave the Navy while others choose to stay in: The enjoyment of one's work is paramount, but we find

nuanced differences between the cyber and communicator tribes. For the cyber warriors, who appear to enjoy their cyber jobs especially much, being able to specialize and continue with cyber jobs seems likely to keep them in the Navy, whereas the requirement to generalize and rotate into less enjoyable jobs seems likely instead to push them into the civilian sector. For the communicators, the opportunity to either specialize or reach command seems key to keeping them in the Navy, whereas if unable to do either, they seem likely instead to leave for civilian jobs. For both tribes, situated characteristics such as motivational versus toxic leaders and quality of life issues must balance with other motivational and dissatisfying factors.

Thus, we identify four significant retention risks: 1) Rotation out of cyber jobs, 2) generalization through job breadth, 3) dearth of command opportunities, and 4) repeated exposure to toxic leaders. We then outline recommendations for retaining IWC talent. One recommendation is to propose an alternate career path for talented officers who do not seek command, one that would enable such officers to "homestead" in cyber and other jobs as specialists instead of generalists. This could potentially address the first two retention risks directly, and it could have an indirect effect on the third by reducing competition for the limited number of milestone and command billets. Another recommendation could consider breaking some very large commands into smaller parts, which would accommodate more officers seeking command. The final recommendation proposes to include command climate survey results on leaders' fitness reports; to identify talented IWC personnel; and to grant them limited access to more-senior officers above their direct superiors.

Of course, much work would be required to implement recommendations along these lines, and it is unclear what impact they would have upon the detailing process, morale, perceived fairness, recruiting, the chain of command and other areas, and we leave the answers to such questions as topics for future research. Nonetheless, they offer potential to help keep talented information warriors from leaving the Navy.

Understanding talent represents the first step toward identifying and retaining the best IWC people before they leave the Service. This qualitative study addresses the issue directly, building up a grounded understanding of *IWC talent* and identifying both positive and negative issues driving talented people's decisions to leave or stay in the

Navy. Results elucidate unique aspects of IWC talent and retention, in addition to attributes and issues that information warriors share with other Service members, and they highlight opportunities for Navy leaders to address talent and retention in the IWC and beyond. The next step is to inform the IWC leadership of these results and to offer assistance in terms of analyzing alternate courses of action. Beyond that, we envision excellent opportunity to apply this same, grounded study method to other Navy warfare communities that may have problems with retaining talented officers, in addition to enlisted people, and can foresee the Navy leading the way for our other military services to identify, motivate, promote and retain their most talented people.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A – RECRUITMENT SCRIPT

This is the script used to recruit volunteers to participate in the study.

> Hello, [Senior IWC officer] referred me to you and other 18XX officers here at NPS regarding a qualitative study that I'm leading to gain insight into how to treat and retain talented officers in the Information Warfare Community. Through consultation with OPNAV N1, we have identified this community as particularly important and dynamic at present, and our conversations with the Information Warfare Center of Excellence suggest that it could benefit from improvements in how it assigns, promotes and retains talented officers. When you have a convenient opportunity, kindly let me know if we could set up a time to chat—either in person or by telephone, Skype or like means—for a half hour or so. Your input will be anonymous, and nothing in our report will identify you in any way. Indeed, I will shred the participant list when the study is complete, so you are welcomed and encouraged to be candid. We're looking for information and insight from within the community, and the timing looks good in terms of interest at N1.
>
> Thank you in advance for your consideration. Please let me know if you have any questions or concerns.
>
> -- Prof. Mark Nissen

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B – BACKGROUND INFORMATION QUESTIONNAIRE

This questionnaire is used to collect background information prior to interviews.

Background Data
Please fill in as many fields as you are able. Your information will remain confidential.

1. Date of Commissioning (YYMM): _____

2. Commissioning source (check field that applies):
USNA __ ROTC __ OCS_OTS __ Direct __ Other Commissioning Source ____

3. Prior Enlisted (check field that applies): Yes __ No __

4. Undergraduate College attended: _____

5. Year of graduation from college (YYMM): _____

6. College Major:_____

7. Undergraduate GPA: _____

8. Do you hold a graduate degree? (check field that applies):
Yes __ No ___ . If Yes, in what major (specialty) ? _____

9. Rate at commissioning: _____

10. Designator at entry (check the field that applies): SWO ___ Submarine ___ Special Warfare/EOD ___ Aviator ___ RL ___ Staff____ ; If RL, what designator code?____

11. Married, at commissioning date (check field that applies): Yes __ No __

12. Dependent children, at commissioning date (check field that applies): Yes __ No __

13. Married, at current date (check field that applies): Yes __ No __

14. Dependent children, at current date (check field that applies): Yes __ No __

15. Current rate: _____

16. Current designator: _____

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C – COMMON INTERVIEW QUESTIONS

All participants are asked these 10 questions to provide a common basis.

Research Interview Questions

Introduction
"Thank you again for participating in the study on retaining talent in the Information Warrior Community. You were identified among a pool of NPS information warrior students, and I selected you along with several others for your potential to inform our study well. As a note, your comments will be kept anonymous, no personal details about you will appear in the study report or briefings, and only you and I will know that you participated in the study. Once you sign the consent form, I'll ask you a few relatively open ended questions, which I hope that you'll answer candidly. The interview should take 30 to 45 minutes, but we can go longer if you wish. Do you have any questions? Are you ready to begin?"

General Questions (presuming all subjects are Navy service members still)

1. What led you to join the Navy?
2. Can you tell me about how your career has progressed to this point?
3. What was your last assignment, and where do you hope to be assigned next?
4. What do you like most about your work in the Navy? What do you like least?
5. When is your next decision point regarding whether to stay in the Navy or not?
6. What factors are pulling you to stay in the Navy, and what are pulling you away?
7. At this point, do you anticipate staying in or leaving the Navy? Why?
8. What if anything would have to be different for you to change your mind?
9. Is there anything else that you can tell me to help understand your motivation?
10. Is there anything else that the Navy should know or do?

Revised 02/03/2016

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Anonymous. (2015). Issues with Navy surveys. Personal communication with Navy Manpower and Personnel expert.

Bernard, H.R. (1998). *Handbook of Methods in Cultural Anthropology.* Walnut Creek, CA: Altamira Press.

Breuer, P. (2015). The Truth about Cyberspace Operation: Operational Savvy Simply Cannot Be Mass-Produced. *CHIPS.* Jan-Mar 2015.

Christensen, E., Brannman, S., Almendarez, M., Sanders, J., & Kimble, T. (2002). *Navy Speciality Physician Study: Historical Overview, Retention Analysis, and Synopsis of Current Civilian-Sector Practices.* Center for Naval Analysis Report CRM-D0004916. A2. Alexandria, VA.

CNPPAO. (2014). 5 Things You Need to Know: Career Viewpoint Survey Goes Live July 1. Navy New Service Story NNS140619-12. URL: http://www.navy.mil/submit/display.asp?story_id=81752 ; retrieved 2 June 2016.

Collings, D.G. & Mellahi, K. (2009). Strategic talent management: A review and research agenda. *Human Resource Management Review, 19,* 304-313.

Cooke, T. W., & Quester, A. O. (1992). What Characterizes Successful Enlistees in the All-Volunteer Force: A Study of Male Recruits in the US Navy. *Social Science Quarterly, 73*(2), 238-52.

Corley, W., McAnallen, E. & Palmer, B. (2015). Measuring Individual Capability and Talent. N1Z4 Predecision briefing. PowerPoint slides received from authors.

Dangerfield, R. (2016). Quotations on BrainyQuote. URL: http://www.brainyquote.com/quotes/authors/r/rodney_dangerfield.html ; retrieved 8 June 2016.

Denzin, N.K. (1994). The Art and Politics of Interpretation. In: Denzin, N.K. and Lincoln, Y.S. (Eds.), *Handbook of Qualitative Research.* Thousand Oaks, CA: Sage, 500-515.

Dodge, J. (2016). The War for Tech Talent Escalates. *Boston Globe*. 19 February 2016.

DON CIO. (2016). Knowledge management. URL: http://www.doncio.navy.mil/TagResults.aspx?ID=33 ; retrieved 2 June 2016.

Eisenhardt, K.M. (1989). Building Theories from Case Study Research. *Academy of Management Revie. 14*(4), 532-550.

Frith, T. (2007). ARGUS Tracking System Widens Net. Navy News Service Story NNS070327-02. URL: http://www.navy.mil/submit/display.asp?story_id=28471 ; retrieved 2 June 2016.

Gioia, D.A., Thomas, J.B., Clark, S. & Chittipedi. K. (1994). Symbolism and strategic change in academia: The dynamics of sense making and influence. *Organization Science, 5*(3), 363-383.

Glaser, B. & Strauss, A. (1967). *The Discovery of Grounded Theory.* New York: Aldine.

Hurlock, R. E., & Montague, W. E. (1982). *Skill retention and its implications for navy tasks: an analytical review*. Navy Personnel Research and Development Center Report NPRDC-SR-82-21. San Diego, CA.

IDC. (2016). Information Dominance Corps Brochure. URL: http://www.navy.com/dam/Navy/Navy-IMG/Downloads/pdf/IDC-brochure/0210-IDC-brochure.pdf ; retrieved 2 June 2016.

Kraus, A., Parcell, A, Reese, D. & Shuford, R. (2013). Navy Officer Diversity and the Retention of Women and Minorities: A Look at the Surface Warfare and Aviation Communities. Center for Naval Analysis Report DRM-2013-U-005306-Final.

LaGrone, S. (2014). Interview: U.S. Navy Personnel Chief Worries over Potential Service Retention Problems. *USNI News.* Article 2, December 2014.

Lewis, R.E. & Heckman, R.J. (2006). Talent management: A critical review. *Human Resource Management Review, 16*(2), 139-154.

Linn, R.A. (2009). Information Warfare Officer Retention: Using a Capabilities-Based Assessment to Solve Retention Issues. Naval Postgraduate School Operations Research Department Masters Thesis. Monterey, CA.

Miles, M.B. and Huberman, A.M. (1994) *Qualitative Data Analysis* (Second Edition). Thousand Oaks, CA: Sage.

Nash, K. (2016). Tech Talent Gaps Hold Companies Back. *Wall Street Journal*. 2 June 2016.

Nelson, K.M., Nadkarni, S., Narayanan, V.K. & Ghods, M. (2000). Understanding Software Operations Support Expertise: A Revealed Causal Mapping Approach. *MIS Quarterly, 24*(3), 475-507.

NIDC. (2016). Navy Information Dominance Corps Human Capital Strategy. URL: http://www.public.navy.mil/fccc10f/Strategies/Navy_Information_Dominance_Corps_Human_Capital_Strategy.pdf ; retrieved 2 June 2016.

Nissen, M.E. (2014). *Harnessing Dynamic Knowledge Principles in the Technology-Driven World.* Hershey, PA: IGI Global.

Parcell, A., Hodari, A. & Shuford, R. (2003). Predictors of Officer Success. Center for Naval Analysis Report CRM D0007437.A2/Final.

Parcell, A. & MacIlvaine, M. (2005). Naval Flight Officer Attrition. Center for Naval Analysis Report CAB D0011671.A2 / Final.

Reich, B.H. and Kaarst-Brown, M.L. (1999). 'Seeding the Line': Understanding the Transition from IT to Non-IT Careers. *MIS Quarterly, 23*(3), 337-364.

Rocco, J. M., Pugh, W. M., & Gunderson, E. E. (1977). Identifying Determinants of Retention Decisions. *Personnel Psychology*, *30*(2), 199-215.

Rosenbush, S. (2016). The Morning Download: CIOs Say War for Tech Talent Takes Toll on Companies. *Wall Street Journal*. 3 June 2016.

Rubin, H. & Rubin, I. (1995). *Qualitative interviewing: the art of hearing data.* Thousand Oaks, CA: Sage.

Schroevers, M. & Hendriks, P. (2012). Talent management in knowledge intensive organizations. In: H. Hou (Ed.), *New Research on Knowledge Management Models and Methods*. INTECH. URL: http://www.intechopen.com/books/new-research-on-knowledgemanagement-models-and-methods/talent-management-in-knowledge-intensive-organizations ; retrieved 2 June 2016.

Singer, A., & Morton, A. S. (1969). A study of enlisted Navy retention. *Personnel Psychology, 22*, 19–31.

Snodgrass, G. (2014). Keep a Weather Eye on the Horizon: A Navy Officer Retention Study. *US Naval Institute Blog*. March 2014.

Snodgrass, G. & Kohlman, B. (2014). *2014 Navy Retention Study*. URL: http://www.military.com/PDF/2014-Navy-Retention-Study-Report-Full.pdf ; retrieved 2 June 2016.

Strauss, A. & Corbin, J. (1990). *Basics of qualitative research* (Vol. 15). Newbury Park, CA: Sage.

Sullivan, D. J. (1998). *Job Satisfaction among United States Navy and Marine Corps Aviation Officers-A Study of the Impact on Career Retention*. Naval Postgraduate School Masters Thesis. Monterey, CA.

Tarique, I. & Schuller, R. (2012). Global talent management literature review. SHRM Foundation paper. URL:

http://www.shrm.org/about/foundation/products/Documents/GlobalTMLitReview-FINAL.docx ; retrieved 2 June 2016.

Thomas, J.B., Sussman, S.W. & Henderson, J.C. (2001). Understanding 'Strategic Learning': Linking Organization Learning, Knowledge Management, and Sensemaking. *Organization Science*, *12*(3), 331-345.

USNA. (2016). Information Dominance Corps Overview. US Naval Academy Cyber Center. URL: http://www.usna.edu/CyberCenter/_files/documents/idc/IDC_Overview.pdf ; retrieved 2 June 2016.

USNO. (2016). US Naval Oceanography Portal. URL: http://www.usno.navy.mil/ ; retrieved 2 June 2016.

Van Maanen, J. (1979). The Fact of Fiction in Organization Ethnography. *Administrative Science Quarterly*, *24*(4), 539-550.

Yin, R.K. (1994). *Case Study Research: Design and Methods* (Second Edition). Thousand Oaks, CA: Sage.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California

3. Research Sponsored Programs Office, Code 41
   Naval Postgraduate School
   Monterey, CA 93943

THIS PAGE INTENTIONALLY LEFT BLANK

ELECTRONIC DISTRIBUTION LIST

4. Mr. Wayne Wagner
   wayne.wagner.ctr@navy.mil

5. Mr. Burt Palmer
   burt.t.palmer@navy.mil

6. Ms. Eve McAnallen
   Eve.McAnallen.ctr@navy.mil

7. Mr. Jim Tanner
   james.tanner@navy.mil

8. CAPT Jim Raimondo
   raimondo@usna.edu

9. LT Dave Hooper
   david.a.hooper@navy.mil

10. Mr. Sean Bhattacharya
    sean.bhattacharya@navy.mil

11. CDR Pablo Breuer
    pcbreuer1@nps.edu