

KNOWLEDGE-SHARING AND VIRTUAL COMMUNITY OF PRACTICE
POTENTIAL IN THE USCG'S AFLOAT COMMUNITY: A QUALITATIVE CASE
STUDY

by

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ABSTRACT

Virtual Communities of Practice (VCoP) may provide the afloat community of the USCG greater opportunities for learning and professional development. The affordances of virtual engagement, including increased access to learning and peer feedback may enhance interaction and opportunities for the development and refinement of professional expertise. Although the specific learning needs and constraints of this community, including geographic separation and dynamic deployment schedules, appear well-aligned with VCoP structure and objectives, it is critical that the knowledge-sharing culture of the USCG's afloat community be thoroughly explored before pursuing any form of performance and learning intervention. Grounded in Lave and Wenger's (1991) concept of legitimate peripheral participation, along with situated learning, social cognitive theory, and social exchange theory, this study revealed that the afloat community possesses potential for successful engagement in a VCoP. Members share knowledge frequently within the community and demonstrate experience, interest, and comfort with virtual learning. However, the afloat community's potential for engagement in a VCoP may be challenged by members' perceptions of trust and vulnerability with sharing information on mistakes and lessons learned. Recommendations for enhancing trust and promoting communal development and sustainment are presented.

Disclaimer: This study is not official U.S. Government or U.S. Coast Guard research. The views expressed herein are those of the researcher and are not official policy statements nor intended to result in official policy.

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CHAPTER I: INTRODUCTION

The afloat community of the United States Coast Guard (USCG) includes a network of individuals, including both commissioned officers and enlisted members, whose professional specialty involves the operation, maintenance, and management of ships, referred to as “cutters,” within the USCG. This community consists of a diverse amount of professional expertise and experience, ranging from members who have recently been accessed into the service to commanding officers of large ships who have spent the majority of their careers at sea. The afloat community’s geographic area of responsibility is also diverse and expansive. As the primary maritime protector of the Western Hemisphere, the USCG’s afloat members are deployed throughout the world and conduct a wide range of missions, including counterterrorism, border security, environmental protection, drug interdiction, and rescue operations (USCG, 2014). Experience at sea in these multiple mission sets and locations is so critical to establishing expertise and providing exposure to updated equipment, policy, and procedures that officers must spend a minimum of three years stationed on ships to achieve entry-level apprentice status within the afloat community. Conversely, officers typically do not exceed seven consecutive years stationed in positions ashore in order to remain proficient and retain their designation as afloat specialists. Additional tours afloat enable members to accrue the sea time and afloat knowledge required of journeyman and master levels of expertise within the afloat operational specialty (USCG, 2013a). Consistent access,

interaction, and practical application of shipboard knowledge are essential to the afloat community's professional development.

Gaining experience and subsequently achieving "permanent cutterman" (USCG, 2013b, p. 7-5) status is a universal goal of the afloat community. By achieving the requisite professional qualifications, a positive endorsement from their commanding officer, and serving a minimum of five years at sea, afloat members may become permanent cutterman and are authorized to wear the cutterman's insignia on their uniform (USCG, 2013b). This coveted designation provides a visual representation of afloat experience and a member's contribution to the afloat community. The permanent cutterman designation may be achieved concurrently or while in pursuit of the professional hallmark of the afloat community, command at sea, whereby one assumes all authority, accountability, and responsibility for the vessel and its crew.

The USCG's Officer Specialty Management System aligns afloat professional development requirements, including training, education, professional certifications, and sea time with corresponding specialty designations, including apprentice, journeyman, and master (USCG, 2013a). Achieving the afloat specialty designation is critical to a member's career planning and viability. To achieve and maintain their afloat specialty, members must fulfill a series of qualifications and positional requirements, including formal training delineated by a master training list (USCG, 2013b). Training requirements may also be achieved through a variety of mediums in addition to resident training, including structured on the job training, and online training (USCG, 2017). Although the master training list represents minimum training requirements for afloat members that are funded by the USCG, afloat training policy dictates that "additional

[formal] training will not normally be authorized unless special or exigent circumstances are present” (USCG, 2013b, p. 3-2). Additionally, organizationally sponsored afloat training opportunities are limited by funding and student throughput capacity (USCG, 2013b).

Virtual Communities of Practice (VCoP) offer an accessible and potentially cost-effective mechanism for professional development and knowledge exchange (Kok, 2010). In this study, VCoP are defined as learning communities in which members are geographically separated and communicate primarily through either synchronous or asynchronous online communication technologies (Dubé, Bourhis, & Jacob, 2005; Wenger, McDermott, & Snyder, 2002). The afloat community’s use of a VCoP may extend professional networking opportunities and access to subject matter experts associated with costly formal training and professional symposiums, such as the annual Commanding Officers Conference. Online communication technologies also offer flexible response time and rapid information exchange (Ho et al., 2010). These efficiencies are in direct alignment with the military’s emphasis on consistent training and enhanced proficiency (Salas, Milham, & Bowers, 2003).

Although the potential for VCoP to augment professional development and training opportunities exists, a greater understanding of the knowledge-sharing culture of the USCG’s afloat community is necessary before attempting this intervention. Hofstede (1998) advocated that culture be fully understood at the component level to ensure alignment between individual values and larger strategic aims. In this study, the components of the afloat community’s knowledge-sharing culture that were explored include perceptions of trust and reciprocity, disposition towards virtual learning, and

willingness to share knowledge. Literature reveals that these components are significant influences in the decision to share knowledge virtually. In order for the afloat community to form a successful virtual community of practice, its knowledge-sharing culture should reflect an overall willingness to share information virtually. Otherwise, the community will likely fail due to attrition (Johnson, 2001). The results of a pilot study and the researcher's experience as a member of the afloat community suggest that afloat members are willing to share knowledge virtually and that a VCoP may enhance professional development, knowledge management, and communal engagement. Since a VCoP does not yet exist, this research further explored the potential for VCoP engagement in the afloat community.

Statement of the Problem

Due to unique and dynamic operational demands and a limited training budget, the USCG's afloat community has limited opportunity for professional development and formal training. High personnel turnover rates challenge knowledge management and organizational stability as in many public sector organizations (Camilleri & Van Der Heijden, 2007). Afloat members typically only spend two years stationed on a ship before transferring to a job ashore. Shore tours provide afloat members the opportunity for professional broadening and work-life balance, but these tours may be one to two years longer than shipboard tours and challenge members' abilities to remain proficient and up to date with afloat operations, specifically regarding updated policy and procedures.

In the afloat community, the majority of formal training occurs before a member's assignment to a ship and may include a combination of operational, administrative, and leadership instruction specific to the member's class of ship and position. The afloat

community also engages in a robust unit training program, composed of structured on-the-job-training (OJT), drills, and exercises (USCG, 2013b). OJT fulfills specific performance requirements in pursuit of personal qualifications and proficiency. This type of training is typically more prevalent and impactful for junior members because they are working on their initial qualifications, whereas more senior members of the command will be serving in a strategic, supervisory capacity and have already obtained their initial watchstanding qualifications. More senior members of the crew, specifically the commanding and executive (second in charge) officers (if funding is available), are provided with a brief familiarization cruise prior to reporting to their ship. This intent of this cruise is to provide a period of time at sea for the prospective commanding officer to familiarize himself with the ship he will soon command.

The affordances of VCoP are well aligned to the needs of the afloat community. Specifically, VCoP may afford increased access to subject matter experts, flexible knowledge management, and opportunities for rapid performance feedback and innovation (Wasko & Faraj, 2000; Yamklin & Igel, 2012). The afloat community's prioritization of these affordances and preference for virtual knowledge-sharing, however, should not be assumed. The knowledge-sharing culture of the afloat community was explored to determine its compatibility with a VCoP. Specifically, the afloat community's willingness to share knowledge, trust, reciprocity, and disposition towards online learning was investigated to determine its potential engagement in a VCoP.

Trust

Communal trust and positive perceptions of others' integrity have a significant influence on members' willingness to exchange knowledge. Usoro et al. (2007)

quantified trust in a virtual community according to the amount of integrity, benevolence, and shared professional competence members' expressed in themselves and others.

Although integrity and the desire to serve the greater good are highly regarded tenets within the USCG's afloat community, perceptions of competence may be unduly influenced by the rank disparity. When studying a VCoP in the United States Air Force, Orhun and Hopple (2006) determined that perceived power imbalance negatively impact knowledge-exchange between members. Given the organizational similarities between the USCG and USAF as armed services, the impact of trust on knowledge sharing was examined.

Reciprocity

Despite the lack of face to face interaction, VCoP members exchange knowledge in accordance with a commonly held set of social expectations (Lin et al., 2009). Social exchange theory espouses that individuals typically contribute the quantity and quality of actions that they anticipate receiving from others (Blau, 1964; Cheung, Lee, & Lee, 2013). If afloat members do not perceive a balance between the information shared within the community, they may be less likely to contribute. Knowledge reciprocity was considered a potential influence on knowledge-sharing within the afloat community at the onset of this study.

Disposition Towards Online Learning

The technical infrastructure of VCoP requires members to have some degree of technical capability and comfort with virtual communications (Wang & Haggerty, 2009). The geographic segregation and unique operating schedules of USCG ships also support the use of virtual communications such as email. Afloat members' disposition towards

online learning, however, may not align with virtual communication preferences. The fact that members may choose to correspond on routine matters via email or conduct business via teleconference does not necessarily mean that they are willing to learn in a virtual environment. Understanding the willingness of afloat members to share knowledge virtually was critical to assessing the community's potential engagement in a VCoP.

Theoretical Framework

Situated Learning and Legitimate Peripheral Participation

Situated learning implies that knowledge cannot be separated from the environment in which it is applied and poses that learners should participate in “complex, messy problem-solving” (Johnson, 2001, p. 47) where they leverage their capabilities and take ownership in the process. Participation is central to CoP structure and function, whereby individuals learn by doing. Situated learning in a CoP implies that practice and knowledge should not be separated from each other and learners must rely on experience and interpersonal interaction to construct knowledge (Cox, 2005). Lave and Wenger (1991) posed that learning occurs through “legitimate peripheral participation,” (p.29) when new learners acquire knowledge by becoming active and engaged in the Community of Practice (CoP). Learners start at the periphery of their community when they have accrued minimal knowledge, and they move towards the center of activity and participate more fully as they learn from more experienced and skilled community members (Johnson, 2001).

Lave and Wenger's (1991) concept of legitimate peripheral participation is grounded in social constructivism whereby learning is accomplished in a group setting (Brown & Duguid, 1991). In CoP, knowledge development is a social function in which

learners attribute meaning to their practice according to the experience and social interaction in which it occurred (Barab & Duffy, 2000; Lave, 1991; Resnick, 1987). This meaning also centers around the sense of personal identity that is generated by belonging to a community (Handley, Sturdy, Fincham, & Clark, 2006). Handley et al. (2006) emphasized the significance of social identity and interdependence within a CoP. As learners develop their identity and strive to solve real world-issues, they strengthen relationships with group members and collaboratively achieve objectives. Legitimate peripheral participation empowers learners to become communal insiders through practice and engagement (Brown & Duguid, 1991; Lave & Wenger, 2002). To facilitate communal engagement and peripheral participation, the factors influencing knowledge sharing in a CoP, including trust, reciprocity, and disposition towards virtual learning in a VCoP, must be understood.

Social Exchange Theory and Social Cognitive Theory

Social Exchange Theory (SET) and Social Cognitive Theory (SCT) are frequently applied when attempting to understand how and why individuals choose to share knowledge and information with one another (Chen & Hung, 2010). Social exchange theory (SET) poses that individuals exchange knowledge in accordance with what they expect to receive from others (Blau, 1964; Chen & Hung, 2010; Cheung, Lee, & Lee, 2013; Lin et al., 2009). Expectations regarding the degree of knowledge exchange constitute the “norm of reciprocity” (Chen & Hung, 2010). Reciprocity is directly related to both trust and knowledge sharing within learning communities (Usoro et al., 2007; Chen & Hung, 2010). When individuals’ expectations regarding the amount and type of knowledge exchanged are fulfilled, communal trust is positively impacted (Usoro et al.,

2007). Understanding the impact of trust on knowledge-sharing is central to this study and frames the central research question, whereby the degree of trust shared within the afloat community will be explored.

Similar to SET, SCT is a widely accepted theory used to understand and detail individual behavior in a social learning environment (Chen & Hung, 2010). SCT relates learning to observation and social interaction. SCT poses that as individuals observe one another and are able to interact in their environment, learning occurs (Bandura, 1986). SCT provides a framework through which knowledge-sharing may be viewed in the virtual environment. Understanding the influences of knowledge-sharing and how afloat members perceive knowledge-exchange will aid the researcher in developing recommendations for communal learning.

Purpose of the Study

A VCoP may provide a versatile, accessible mechanism for afloat members to learn and engage in professional development. Research suggests that successful VCoP are dependent upon effective knowledge sharing between members (Lin et al., 2009; Usoro et al., 2007). Trust, reciprocity, and disposition towards online learning have a significant impact on members' willingness to exchange knowledge in a VCoP (Ardichvili et al., 2003; Lin et al., 2009; Usoro et al., 2007). The purpose of this qualitative case study was to explore how the knowledge-sharing culture of the afloat community is suited for potential VCoP engagement. It is important to note that potential engagement was explored because a VCoP does not yet exist for the afloat community. The afloat community's knowledge-sharing culture refers to member's overall

willingness to share knowledge, perceptions of trust and knowledge reciprocity, and disposition towards online learning.

Participation and consistent knowledge exchange are critical to the development and sustainment of VCoP (Ardichvili, Page, & Wentling, 2003; Wenger, 1998b, 2000). The researcher applied Lave and Wenger's (1991) theory of legitimate peripheral participation to understand the influences and possible limitations of communal knowledge exchange in the afloat community. SCT and SET were also used to analyze afloat members' perceptions of knowledge sharing and engagement in communal learning. Specifically, SET was applied to analyze afloat member's perceptions regarding the balance of information shared within the community and the potential influence of knowledge reciprocity on knowledge exchange. Additionally, this study emphasized the existence and influence of trust in the afloat community, including members' expressed comfort with sharing mistakes and lessons learned with other afloat members. Trust is a major influence in the decision to share knowledge and was explored to further qualify the afloat community's potential for VCoP engagement (McKnight, Choudhury, & Kacmar, 2002; Usoro et al., 2007).

To facilitate an in-depth exploration of the afloat community's knowledge-sharing culture and how this community may be suited for VCoP engagement, a qualitative case study methodology was employed. The qualitative case study was appropriate for this research because an in-depth analysis of a single, bounded case is required (Yin, 2014). The afloat community constituted a single case whose knowledge-sharing culture was described using open-ended surveys and interviews. Participants in this study included members stationed throughout the USCG serving on ships and in staff tours, diversifying

the respondent pool. Through this research, an informed recommendation on the afloat community's potential engagement in a VCoP was made, including recommendations for communal development and sustainment.

Research Questions

The afloat community's potential for VCoP engagement was explored within the context of effective knowledge-sharing. Research reveals that knowledge-sharing is positively influenced by the presence of trust and reciprocity which are addressed in the first two questions guiding this study (Ardichvili et al., 2003; Lin et al., 2009; Usoro et al., 2007). The first question clarified members' overall willingness to share knowledge and perceptions regarding the balance of knowledge shared, or reciprocated, within the community. The second question addressed communal trust in accordance with members' comfort with sharing mistakes and lessons learned. Specific to VCoP, learners' willingness to communicate in virtual forums and overall technical disposition are primary influences in knowledge-sharing (Wang & Haggerty, 2009). The last question addressed members' disposition towards learning in a virtual environment.

The following research questions guided this study.

- How do members of the afloat community describe their willingness to share knowledge?
- How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?
- How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Definition of Terms

Afloat Community - the collective group of USCG members who have served tours of duty or are currently serving tours of duty on ships.

Disposition towards online learning - afloat members' desire and comfort with learning in a virtual forum.

Knowledge reciprocity - afloat members' perceptions regarding the balance of information exchanged between members.

Trust - members' comfort with sharing mistakes and lessons learned with other members.

Virtual Communities of Practice (VCoP) - learning communities in which members are geographically separated and communicate primarily through either synchronous or asynchronous virtual forums (Dubé et al., 2005; Wenger et al., 2002).

Communities of Practice (COP) – learning communities in which members communicate primarily in person.

Chapter Summary

VCoP may offer an opportunity for valuable professional development and information exchange for the USCG's afloat community. The structure of the virtual environment and the efficiencies that it may provide to afloat members may have significant organizational impacts. The community's willingness to share knowledge and the interplay between communal trust, reciprocity, and the desire to share knowledge virtually should be explored to understand the potential for VCoP development. SCT, SET, and legitimate peripheral participation provided the theoretical framework through which knowledge-sharing was explored and described. Research on VCoP parameters,

affordances, constraints, and applications was outlined in Chapter Two and compared to the empirical research on the afloat community's knowledge-sharing culture. Chapter Three detailed the qualitative methods used to collect, analyze and validate data, including modifications to these methods based upon emergent research developments. Chapter Four provided a detailed discussion of the findings and Chapter Five summarized the findings, addressed the three research questions, and offered limitations of the study with recommendations for practice and future research. This study filled a research gap on the knowledge-sharing culture of the afloat community and factors influencing the development and sustainment of VCoP.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter addresses the theoretical foundations, structure, influences, opportunities, and limitations of CoP for collaborative learning. In this literature review, the term CoP versus VCoP will be applied to detail attributes of learning communities relevant to both face-to-face and virtual approaches. Specifically, knowledge-sharing practices and the impact of trust, altruism, and reciprocity in communal engagement will be discussed from a theoretical perspective common to virtual and face-to-face communities. Methods for fostering effective knowledge-sharing will also be outlined. Unique qualities and limitations of VCoP involving members' technical dispositions and opportunities for interaction will be addressed at the conclusion of this chapter.

Communities of Practice (CoP) offer collaborative learning environments to facilitate the pursuit of educational, occupational, or organizational objectives. Although originally considered an organically formed group of individuals bound by shared goals and likened to a system of apprenticeships, CoP are now frequently engineered around a specific objective or to promote cooperation and engagement (Lave & Wenger, 1991; Wenger, McDermott, & Snyder, 2002). Traditional face to face communities are augmented through the use of virtual communication forums and are able to engage a wider audience and talent base than previously imagined (Hildreth, Kimble, & Wright, 2000). From an educational perspective, CoP can broaden the reach and reality of classroom learning with real-world problem solving in a manner consistent with situated, constructivist objectives (Wilson, Ludwig-Hardman, Thornam, & Dunlap, 2004; Cox,

2005). From the performance improvement practitioner's perspective, CoP offer the potential for personal and professional development through enhanced knowledge management and interpersonal engagement (Johnson, 2001). Regardless of the objective, the capabilities, limitations, and suitability of CoP for a particular learning and performance need must be fully understood before employment.

Components, Purpose, and Applications of CoP

CoP are groups of individuals with shared history and objectives who work with and learn from one another in pursuit of a common goal (Lave & Wenger, 1991; Wenger et al., 2002). CoP can be deliberately engineered to facilitate the achievement of organizational or learning objectives, but formal membership is not required for successful interaction. There are three components that CoP must possess in order to function effectively, including domain, community, and practice (Wenger et al., 2002). Barab and Duffy (2000) contributed the additional element of reproducibility, whereby the community must be capable of generating new members with requisite levels of expertise to develop and exchange knowledge. Domain refers to the community's purpose and objectives, whereas communal structure includes the interactions and relationships of members. Lave and Wenger (1991) emphasized the natural development of these components, as demonstrated through traditional apprenticeships. By contrast, Wenger and Snyder (2000) advised that organizational investment is necessary to promote communal development and formally legitimize the communal domain. Communal practice, including the products, artifacts, and activities that the group shares and employs in the learning process, can be fostered through systematic organizational

engagement and support of communal outcomes (Wenger & Snyder, 2000). These approaches reflect the core differences in CoP objectives and engagement processes.

CoP are employed in a variety of academic and organizational forums.

Organizationally, CoP are linked to performance improvement efforts, whereby group collaboration is employed to maximize potential and promote the development of expertise (Brown & Duguid, 1991). Brown and Duguid (2001) stressed the role of communities in enhancing both knowledge and practice within an organizational context. Noting that knowledge can be porous and easily leaked from an organization, Brown and Duguid (2001) implied that creating more effective practices and sources of interaction may foster knowledge development and help retain expertise that is otherwise lost through personnel turnover or during the course of inter-organizational transactions.

Participation is critical to knowledge exchange between members because this exchange adds new meaning and context to information that increases its versatility for future applications (Wenger, 1998b). Although seemingly counterintuitive, Wenger (2000) considered boundaries beneficial to participation and knowledge-sharing. Boundaries entail distinctions between core competencies and skills that can be thoroughly enriched through interaction and cross-training. Wenger (2000) argued that boundaries increase transparency and enable learners to have a more accurate inventory of their talents and those of other communities. In turn, learners can augment their talent base by crossing boundaries to engage with other communities.

Organizationally, CoP are considered valuable assets in knowledge management efforts in which tacit knowledge can be transferred and retained (Cox, 2005). The concept of knowledge management, including how organizations identify, codify, and

store knowledge for future succession and competitive advantage was initially heavily reliant upon technological solutions that did not involve personal interaction (Su, Wilensky, & Redmiles, 2012; Van Tiem, Moseley, & Dessinger, 2012). Subsequently, tacit knowledge and the intricacies of both practice and expertise were threatened. CoP provide a viable approach to retaining tacit knowledge that is exchanged and understood through practice and observation. CoP also enable organizations to embrace the development of diverse groups and cross-functional engagement that enhances capability (Brown & Duguid, 2001). Combining technological solutions with CoP is an increasingly popular knowledge management technique throughout a variety of organizations (Ardichvili et al., 2003; Su et al., 2012).

Just as CoP can enhance organizational potential, their proven efficacy in academic settings yields meaningful engagement, discussion, and collaboration between learners. Contrary to a practice field in an academic setting, where students collaboratively address real-world issues in a classroom or similar academic environment, learning communities connect students to society (Barab & Duffy, 2000). In turn, students share and apply their knowledge to real-world issues. As an engineered version of a CoP with academic objectives, learning communities are bounded by the requirements of the formal course in which they function. In turn, bounded learning communities possess specific elements that instructors must design and foster. Wilson et al. (2004) noted seven elements that define a learning community, including a shared goal, safe and supportive environment, central identity, collaboration, inclusivity, progressive knowledge development, and “mutual appropriation,” (p. 4) in which learners reciprocate the knowledge they receive from one another. Instructors play an essential

role in developing and maintaining learning communities by fostering productive discourse and establishing trusting relationships with students (Wilson et al., 2004). In order to uphold the tenants of constructivism and situated learning that Lave and Wenger (1991) considered essential to CoP, instructors should refrain from controlling the community in favor of promoting opportunities for learners to engage and develop.

Importance and Influences of Knowledge Sharing in CoP

Effective knowledge sharing, including the exchange of information between two or more learners, is essential to the development and sustainment of a CoP (Ku & Fan, 2009; Lin et al., 2009). Depending on the community, knowledge-sharing may occur in person or through virtual means. VCoP are communities in which members are geographically or organizationally segregated and communicate primarily through synchronous or asynchronous virtual forums (Dubé et al., 2005; Wenger et al., 2002). Regardless of the preferred communication forum, there are two elements of knowledge sharing that must be fostered in order to maintain the flow of information between members. Ardichvili, Page, and Wentling (2003) described these elements as the desire to share knowledge and willingness to use the CoP as a source of knowledge.

Trust, reciprocity, and the altruistic desire to contribute to the greater good are strong influences in an individual's decision to share knowledge within a community (Ardichvili et al., 2003; Lin et al., 2009; Usoro et al., 2007). Specific to VCoP, learners' comfort and willingness to communicate in virtual forums and overall technical disposition are primary influences in the decision to share knowledge (Wang & Haggerty, 2009). In order to foster a culture of knowledge sharing, these "behavioral determinants" (Lin et al., 2009, p. 929) of knowledge exchange must be understood and developed.

Trust

Trust is defined as a members' positive perceptions and confidence in the good intentions and reliability of community members (Lin et al., 2009). Trust is an abstract concept and challenging to define exclusively, but its presence in a CoP and influence on knowledge sharing is palpable. Usoro et al. (2007) distinguished between knowledge-based and organizational trust, emphasizing the influence of both the individual and the surrounding environment in communal engagement. Knowledge-based trust is established as members interact on a consistent basis and begin to understand what type of information, degree of complexity, and quality of contribution that they can expect from one another. Knowledge-based trust arises as individuals are able to manage their expectations and gain a greater sense of their role and the role of other members within the community (Ardichvili et al., 2003). Organizational trust is established as participation in CoP becomes a normal standard of behavior. Ardichvili et al. (2003) noted that as members grow to expect organizational engagement and see all levels of their organization participate in knowledge-sharing, this behavior becomes the standard and members have confidence in the community.

Usoro et al. (2007) considered communal trust to be the combination of three dimensions, including competence, integrity, and benevolence. Trust, in concert with the integrity of the community, was determined to have the greatest impact on knowledge sharing in Usoro et al.'s (2007) quantitative study. CoP members are more likely to share knowledge when they perceive their fellow members' intentions and contributions to the community to be valid and truthful. Knowledge-sharing is also positively impacted when members feel comfortable sharing their questions and revealing the true extent of their

knowledge with others (Yao, Tsai, & Fang, 2015). Overall personal comfort with one's professional competence and faith in the benevolence and respect of other community members is critical to establishing trust and increasing the flow of knowledge within one's community.

Reciprocity

When community members perceive the contributions of other members to be commensurate with their own, they are more likely to reciprocate these actions.

Reciprocity, in accordance with SET, implies that CoP members return the knowledge and benefits that they receive from others (Blau, 1964; Cheung, Lee, & Lee, 2013; Lin et al., 2009). Chang & Jacobs (2012) compared members' decisions to share knowledge to a cost-benefit analysis, determining that members would only exchange knowledge with others if they perceived the potential benefits worthy of the effort required to engage. The value that members ascribe to their community and potential knowledge exchange must be understood to effectively qualify communal reciprocity. Members' perceptions of the community's ability to enhance work performance or improve career longevity positively influences the decision to participate (Chang & Jacobs, 2012).

Understanding the potential negative impacts of reciprocity is also critical to communal longevity. When members do not believe that their knowledge is valued or that the intentions of other members of the community are positive, their contributions may be reduced. Lin et al. (2009) determined that communal reciprocity was more closely related to trust and self-efficacy than knowledge-sharing, but its potential impact on members' willingness to engage with others and, ultimately, communal longevity should be considered.

Altruism

Similar to the influence of reciprocity in learning communities, knowledge-sharing may be positively impacted by altruism (Wasko & Faraj, 2000). Altruism refers to behavior that is motivated by the desire to be helpful and assist others (Chen, Fan, & Tsai, 2014). Chen, Fan, and Tsai (2014) posed that altruism is a mediating factor in the relationship between trust and knowledge-sharing. Chen et al. (2014) determined that in trusting communities where members participated in communal learning, altruism was also present and members were more likely to make contributions to benefit others. Usono et al. (2007) noted a similarly positive relationship between benevolence based-trust and knowledge-sharing, emphasizing the influence of trust in one's decision to share-knowledge.

Altruism represents a strong source of intrinsic motivation for knowledge-sharing that may compel members to contribute to the community solely because they derive satisfaction from their contributions and assisting others (Chen et al., 2014). Altruism may also increase communal knowledge-sharing because the contributors' sense of self-confidence is enhanced when the community places value on their knowledge contributions (Chen et. al, 2014). As members gain confidence in their contributions, the quantity and quality of knowledge shared is likely to increase.

In public sector communities, the altruistic desire to contribute to the greater good is directly aligned with organizational objectives geared towards service or humanitarian goals (Camilleri & Van Der Heijden, 2007). This alignment may facilitate altruistic knowledge-exchange and participation in communal learning in public sector CoP. Communal altruism may also be the result of the "been there, done that" (Wasko & Faraj,

2000, p. 168) mentality in which one's personal experience motivates him to provide others with the knowledge once needed in familiar situation or position. Individuals may share knowledge in an effort to improve opportunities for others in the community.

Fostering Knowledge-Sharing

Promoting effective knowledge-sharing within communities is not linked to extrinsic benefits. Wasko and Faraj (2000) determined that monetary benefits and material rewards for knowledge-sharing have a negative impact on motivation and knowledge exchange in a CoP. Promoting engagement in CoP as an enterprise and enhancing its legitimacy facilitates continued knowledge sharing and exchange between members (Rogers, 2000; Wenger, 1998a). Wenger (1998a) advocated establishing an identity and position for CoP within the greater organization. Legitimizing the CoP enterprise represents a public expression of faith and value in the communal contributions and capabilities of its members. Similarly, knowledge-sharing is enhanced through structural assistance and support when members are provided with access to essential resources, people, and organizational insight to enhance their thinking and learning abilities (Wenger, 1998a; Wenger & Snyder, 2000).

Designation of a community leader or primary facilitator may also assist members in remaining focused on developing knowledge and tackling core issues. Rogers (2000) advocated the use of mentorship within CoP to provide members with guidance, direction, and focus when desired. Facilitation and mentorship, contrary to instruction, align with CoP's constructivist underpinnings and enable members to acquire and share knowledge while retaining their autonomy (Cox, 2005).

VCoP Influences, Challenges, and Support Mechanisms

The relationship between trust and knowledge-sharing is just as significant in a virtual community as it is in a traditional face to face environment. Hildreth, Kimble, and Wright (2000) considered VCoP to be disadvantaged due to their reliance on virtual communication forums. In the absence of face to face communication in VCoP, members may choose to remain “invisible” (Yao et al., 2015, p. 621) which significantly limits communal learning and productivity. Invisibility may also serve as a precursor to attrition when members discontinue participation in the VCoP. Invisibility is certainly not an option in a face to face environment, but it is also not impervious to purposeful virtual design and technical support.

Johnson (2001) considered attrition the greatest threat to successful VCoP development and sustainment if not purposefully mitigated. To promote participation and appeal to a variety of communication preferences, a multitude of virtual forums may be employed within a single VCoP (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000). Synchronous and asynchronous options, including email, video conferences, blogs, and discussion forums can support the demands of multiple personalities and accommodate a variety of virtual infrastructures. Ultimately, the type of virtual forum that is selected should be aligned with business practices of the organization in which it is being employed and reflect the technical capacity of its users (Johnson, 2001; Kok, 2010).

To promote usability and overcome technical challenges, scaffolding may be incorporated into virtual forums (Johnson, 2001; Jung & Suzuki, 2015). Although traditionally applied in an academic setting, scaffolding is also relevant in organizational

VCoP where the concentration is on professional development and organizational achievement. For example, Jung and Suzuki (2015) described three methods of scaffolding, including worked examples, grouping, and assessment, employed in a wiki based collaborative project to improve participation and outcome. Worked examples, in which learners are able to visualize the end goal, are particularly useful in VCoP and may augment the lack of face to face interaction. The use of assessments, however, may not assist organizational VCoP members given the inherently informal nature of communal learning. Jung and Suzuki (2015) noted that this approach was considered “too confining” (p. 834) for some students.

Grouping efforts promote student interaction and foster working relationships that may take longer to build in a virtual environment (Hildreth et al., 2000). These relationships may also reduce communal attrition and expedite the assimilation process for VCoP members. Grouping strategies are similar to participant structures that establish the periodicity and medium through which members will engage and develop relationships. Barab, Barnett, and Squire (2002) noted that these structures alleviated concerns regarding inactivity and promoted a more regular meeting schedule. The frequency and formality of meeting structures, however, must be in alignment with the needs and preferences of the community in order to foster increased interaction.

In an effort to promote sociability in a VCoP, Barab, MaKinster, Moore, and Cunningham (2001) incorporated collaborative online structures, developed “more visible” (p. 83) online discussions and interaction mechanisms, and established goals for communal engagement. Barab, Schatz, and Scheckler (2004) applied critical elements of activity theory to their online community. Specifically, Barab et al. (2004) took a

systemic approach to the teacher's community, whereby all aspects of individuals, activities, and online components were assessed and altered during development and implementation. Most significantly, Barab et al. (2004) demonstrated how VCoP can be used for multi-dimensional learning, whereby the VCoP facilitates knowledge-sharing for the community member. In turn, the process of learning is more readily observed, studied and better understood by the communal developers to gain a greater understanding for the potential and parameters of the online system. Barab et al.'s (2001) efforts demonstrated the sense of transparency that virtual forums offer the community. Transparency is a unique benefit of VCoP that is aptly suited to the needs of the public sector and its emphasis on accountability (Sabah & Cook-Craig, 2010).

Affordances of CoP

Millen, Fontaine, and Muller (2002) conducted a qualitative analysis of the primary benefits of CoP from an individual, community, and organizational perspective. The majority of individual benefits were derived from the development, recognition, and sharing of expertise. Members considered the ability to quickly identify a subject matter expert essential to job functionality. Communal benefits included the development of a knowledge repository and mechanism for fostering creativity. At the organizational level, benefits included increased business and product innovation. These benefits, however, were quantified only after a thorough assessment of the organization's return on investment. Millen et al. (2002) emphasized the fact that communal development and sustainment required organizational support and funding. As Wenger et al. (2002) cautioned, CoP are not free endeavors and frequently entail sponsorship and leadership for sustainment.

As a knowledge management tool, CoP have proven their value in a barrage of organizational contexts. Yamklin and Igel (2012) presented a case study of one corporation that employed a CoP for knowledge management and dramatically improved its productivity and maintenance completion rates while reducing the number of personnel accidents. The CoP was credited with innovating the corporation's safety policies and approaches to energy management. This corporation excelled at establishing tangible organizational outcomes for the CoP to work towards and for the organization to effectively measure. Iaquinto, Ison, and Faggian (2011) advocated for a similarly purposefully developed CoP to establish a common goal and facilitate a measurable outcome for the organization for assessment. Although formally structured, the pursuit of a common goal is in accordance with Lave and Wenger's (1991) original definition of a CoP and reflective of social constructivist principles whereby learners pursue solutions to realistic problems when provided autonomy and the opportunity to excel (Johnson, 2001).

Lloyd (2005) assessed the benefit of a CoP from a strictly qualitative perspective by observing and interviewing the perspectives of librarians engaged in a CoP. Lloyd (2005) determined that the transfer of tacit knowledge was the most significant affordance of a CoP. Lloyd (2005) illustrated this affordance by describing the professional development of firefighters, whereby they must practice fire-fighting, learn about the properties of firefighting, and engage in a social exchange with more seasoned firefighters in order to master their craft. Just as Lave and Wenger's (1991) community of midwives ascribed the greatest influence on learning to be the stories of other midwives, Lloyd (2005) contended that the exchange of tacit knowledge in both the librarian and

firefighter community was the greatest benefit of communal learning.

Intangible benefits of CoP are frequently cited by members and considered the greatest affordances of belonging to a community. Wasko and Faraj (2000) noted that access to diverse opinions and rapid feedback are significant benefits of communal exchange. This access is particularly notable in VCoP where individuals who may not have been capable of face to face exchange are able to connect virtually and efficiently (Ho et al., 2010). Communal reputation is another benefit and motivating factor for individuals to participate within a CoP. Wasko and Faraj (2000) determined that individuals seek to better the reputation of the whole group. As more knowledge is accumulated, the perception of communal value and expertise is increased internally and externally. Members consider the reputation of their CoP to be a reflection of the viability and potential of their profession (Wasko & Faraj, 2000). CoP afford members the opportunity to actively enhance their professional reputation through learning and interaction.

Constraints

Kerno (2008) and Roberts (2006) considered competitive market economies and cultural conflicts to be a potential knowledge-sharing constraint within CoP. Although organizational needs and the desire to achieve a competitive advantage are often the impetus for communal development, these factors may impact trust and openness within the community. Members may be less willing to share knowledge with others for fear of a loss of influence or financial benefit (Roberts, 2006). Organizational instability and the pressures of a weak economy also threaten trust and security, which are critical to knowledge-sharing (Kerno, 2008).

Collaborative learning may also be perceived as incompatible with hierarchical organizational structures (Kerno, 2008). Although VCoP have the potential to bridge communication gaps within organizations where personal position and rank are highly regarded, the “flat” (Kerno, 2008, p. 77) structure of CoP may prove incompatible with hierarchical personnel structures if virtual communication is ineffective. Cuddapah and Clayton (2011) examined a cohort of novice instructors participating in a new instructor indoctrination program within an urban school district. Contrary to a CoP in a rank-based organization, all members of the indoctrination program possessed similar levels of experience and educational backgrounds (Cuddapah & Clayton, 2011). Cuddapah and Clayton (2011) determined that novice cohorts yield tremendous benefits for instructors with regard to socialization. Specifically, they determined that members are more likely to engage in intellectual “risk taking” (p. 73) when surrounded by their peers than they are with more experienced instructors. Creating a more level playing field is, therefore, conducive to honest, innovative knowledge exchange within communities of practice. Achieving this type of equality, however, may prove difficult since it would require organizations to redefine core infrastructure including performance measures, incentives, job descriptions, reporting relations, information systems, and communication systems (Kerno, 2008).

Epistemic and regional culture can also constrain knowledge sharing and limit CoP development. Similar to the organizational concerns regarding sharing knowledge in an overly competitive work environment, some cultures do not value a collectivist approach to learning. Roberts (2006) cautioned that individualistic national cultures may have difficulty embracing CoP despite the potential advancements and collaborative

capabilities that these communities afford. Similarly, organizational climate may promote internal competition between different departments or groups of employees (Hofstede, 1998).

A competitive organizational climate can also deter knowledge sharing between different CoP. In the event that this competition is encouraged at the organizational level, overall climate may be negatively impacted and individuals will not communicate openly with one another. Similarly, Mørk, Aenestad, Hanseth, and Grisot (2008) noted that knowledge sharing between different professional fields in the same organization may be challenged by conflicting perceptions of value. In Mørk et al.'s (2008) study of medical and engineering communities in a hospital, some fields aligned and interacted more effectively with one another, but others were not included due to a lack of natural interaction or alignment. The result was a lack of cross-disciplinary studies and recommendations for patient care. Mørk et al. (2008) advised that increased interaction will not occur naturally as a result of recommendations or "simply fostering links across professions" (p. 21). Promoting communal integration between different fields or professions in a hospital research environment, much like in a hierarchical public sector organization, requires tremendous organizational commitment and a total reworking of existing processes, infrastructure, legal policy, and research regulations (Mørk et al., 2008).

Technical Disposition and Constraints Specific to VCoP

VCoP offer users the opportunity to overcome geographic and timing constraints, but their success is contingent upon the effectiveness of the virtual tool through which members communicate. Haythornthwaite et al. (2000) recommended incorporating a

variety of tools to accommodate individual preferences, but the selection of a virtual tool must be considered from a systemic standpoint. Kok (2010) studied the activity and contributions of IBM's virtual community of practice to elucidate reasons why this community was relatively unproductive and its associated media tools were frequently under-utilized in favor of other online communication forums. Kok's (2010) study revealed that members were more comfortable with email versus online discussion boards and programs engineered and endorsed by IBM, including Lotus Notes. Members explained that they preferred email because it was consistent with their business processes and, most significantly, because they considered email more reliable. Kok's (2010) findings reveal that VCoP communication forums must reflect the preferences and capabilities of users and their organizational infrastructure.

In addition to personal preferences, members' technical capability must also be considered in VCoP. Wang and Haggerty (2009) advocated that learners should possess virtual competence, self-efficacy, and social skills in order to participate in virtual community of practice. Self-efficacy refers to an individual's confidence and comfort with communicating in a virtual forum (Wang & Haggerty, 2009). Wang and Haggerty (2009) defined virtual competence as the "ability to apply the same technology to different extents in various scenarios" (p. 579). Competence has an impact on virtual social skills, whereby individuals build relationships using virtual forums. These relationships are the product of capability and confidence within the VCoP and are critical to knowledge sharing and communication. Unlike a traditional face-to-face community, VCoP require members to adapt alternative communication mechanisms and procedures. To ensure that members are able to successfully employ their community's

virtual tools, advance research and analysis should be conducted to assess the capabilities of learners and their virtual networks (Dube et al., 2005).

Chapter Summary

CoP, whether virtual or face-to-face, offer a structure through which learning may be enhanced and understood. Improved knowledge management, stronger sense of identity, exploration, and interaction are all outcomes of communal engagement (Lave & Wenger 1991; Rogers, 2000; Wenger, McDermott, & Snyder, 2002). CoP are applied in both academic and organizational settings to improve learning and increase productivity (Brown & Duguid, 1991). Although Lave and Wenger (1991) originally described CoP as organically formed, these communities can be intentionally developed for a particular learning or organizational objective. Participation is essential to communal sustainability and if engagement is not maintained, attrition may result in communal demise (Johnson, 2001). VCoP face unique challenges in maintaining participation levels and promoting engagement. Virtual forums should be selected with organizational limitations and the technical capacity of users in mind (Haythornthwaite et al., 2000; Kok, 2010; Wang & Haggerty, 2009). Lin et al. (2009) recommended that understanding the parameters of knowledge-sharing and encouraging this behavior could enhance communal longevity. Trust, reciprocity, and disposition towards virtual learning are strong influences in an individual's desire to share knowledge (Ardichvili et al., 2003; Usoro et al., 2007). This study will explore these influences on knowledge sharing within the USCG's afloat community.

CHAPTER 3: METHODS

VCoP may enhance learning and professional development opportunities for the USCG, but not enough information exists to qualify the community's potential engagement in a VCoP. A single qualitative case study was conducted to explore the knowledge-sharing culture of the USCG's afloat community and its potential engagement in a VCoP. A single qualitative case study methodology was chosen because qualitative research is exploratory in nature and requires a reflexive and flexible approach by the researcher to capture emergent data (Creswell, 2013; 2014; Yin, 2014). Additionally, a single case study method is recommended when getting access to a case not previously explored through empirical research (Creswell, 2013; 2014; Yin, 2014). This chapter begins with a description of case study methodology and its appropriateness for this research. The results of a pilot study and details on how data was collected and analyzed for this case study are then described in detail.

Qualitative Case Study Justification

When determining the appropriate methodology for this study, the researcher considered the study's purpose, context, and subjects best suited for a qualitative case study. First and foremost, qualitative research is advisable when the research problem requires exploration and an in-depth understanding of contextual issues that may not be understood through the use of quantitative methods (Creswell, 2013). Yin (2014) advocated that a case study is appropriate when the researcher is attempting to elucidate "how' or 'why'" (p.10) a particular phenomenon occurs. Given that the purpose of this

study was to explore how the knowledge-sharing culture of the afloat community is suited for VCoP engagement, understanding interpersonal interaction and social influences was necessary. The researcher felt that the nuances and complexities of this interpersonal engagement would not be appropriately addressed through quantitative methods, nor would participants' voices be captured.

Exploration of the afloat community's knowledge-sharing culture was aligned to the parameters and objectives of a single intrinsic qualitative case study. A single intrinsic case study focusses on the specific details of the case itself as opposed to illustrating an issue within a case or multiple cases (Creswell, 2013; Stake, 1995; Yazan, 2015; Yin, 2014). The presence of boundaries and specificity is critical to effectively defining, researching, and describing a case. Stake (1995) described a single case as an "integrated system" (p. 2) with unique attributes that are detailed and specific enough to be researched individually. Merriam (2009) similarly described a "bounded system" (p. 42) when defining a case. Accordingly, the afloat community of the USCG represents a specific operational segment of the USCG that is detailed and framed within the context of this study. Similarly, the subjects within the case, or afloat members, are exclusively defined by their involvement with the afloat community and further detailed according to demographic categories, including time in service, afloat time, and gender, that were analyzed during the third phase of the analysis cycle and highlighted in the summary of major findings.

The researcher also considered a case study appropriate for this research due to the study's emphasis on context framed by the results of a pilot study and the researcher's own experience as a member of the afloat community. Context is essential to case study

research because it facilitates a holistic analysis and is the foundation of the research question being explored (Stake, 1995; Yazan, 2015). The specific components of knowledge-sharing culture that were explored in this study, including willingness to share knowledge, trust, knowledge reciprocity, and disposition towards virtual learning, were influenced by the theoretical framework, literature review, and pilot study. Yin (2014) emphasized the importance of relying upon existing theoretical propositions to inform targeted data collection and analysis (Yazan, 2015). The results of the pilot study, indicating that communal trust and perceptions of anonymous knowledge-sharing influenced members' willingness to engage in a VCoP, guided the development of survey and interview questions intended to qualify afloat members' perceptions of these influences. Similarly, after initial structural coding of survey data, the researcher identified critical distinctions between respondents' perceptions of afloat vs. ashore knowledge sharing practices and frequency. These critical contextual distinctions influenced the development of follow-on interview questions intended to elucidate members' afloat and ashore knowledge exchange.

To achieve valid, reliable findings, case study research depends heavily upon triangulation, member checks, thick description and placement of the researcher in the study (Merriam, 2009; Stake, 1995; Yazan, 2015; Yin, 2014). This case study employed methodological triangulation, whereby different data collection methods, including surveys and interviews, were employed and compared to validate the findings (Stake, 1995). The use of multiple methods of data collection is a distinctive strength of case study research because it allows for a more comprehensive, holistic view of the research problem (Yazan, 2015). Member checks were also employed during interviews, whereby

the researcher paraphrased and repeated participants' statements. Member checks ensured accurate interpretation of participants' statements for use in data analysis (Merriam, 2009; Stake, 1995). The use of thick description is a similarly unique and powerful tool employed within case study research (Creswell, 2013; Yazan, 2015, Merriam, 2009). By relying heavily upon direct quotations and survey excerpts throughout the description of the findings, an authentic account of the afloat community's knowledge-sharing culture was presented. Thick description also provides a benchmark for transferability, whereby findings of this study may be applied to other settings (Merriam, 2009). Given the unique context and nature of the USCG's afloat community, however, transferability is likely limited. Lastly, the researcher's perspective, objectives, and interests within this case study as both a member of the afloat community and training manager within the USCG is explicitly stated within this study. Understanding this perspective enhanced transparency and provided consideration of potential subjectivity within data analysis and interpretation of findings (Creswell, 2013; Merriam, 2009).

Common criticisms of case study methodology address a less than systematic approach by the researcher, including inconsistent data collection efforts or biased, singular interpretation and presentation of findings (Yin, 2014). To overcome these challenges, an iterative approach to data analysis was conducted and described in detail within this chapter. Additionally, *in vivo* coding was applied during the first phase of data analysis to reduce subjectivity and to accurately reflect the participants' perceptions within themes and major findings. Emphasizing the importance of honesty and balance in the presentation of findings, Yin (2014) drew a critical distinction between the application of case studies in a classroom versus research setting. Yin (2014) stated, "In

teaching, case study materials may be deliberately altered to demonstrate a particular point more effectively. In research, any such step would be strictly forbidden” (p. 14). These study’s major findings are presented objectively and compared to relevant research, pilot study results, and the researcher’s experience as a member of the USCG’s afloat community.

Pilot Study

A pilot study was conducted during Fall and Spring 2017 to investigate the knowledge-sharing culture of the afloat community and its potential for engagement in a VCoP. The pilot study helped inform this case study and specifically the development of an open-ended survey (Appendix D) that seeks to amplify information on members’ desire for anonymity in online knowledge exchange. The pilot study employed an individual interview approach to facilitate in-depth analysis of knowledge-sharing trends within the afloat community and their compatibility with research on knowledge-sharing trends within successful VCoP.

Participants

Six members (4 males, 2 females) of the afloat community with varying degrees of time in service and afloat time were interviewed. All members were commissioned officers stationed at USCG Headquarters in Washington, DC. Participants in this study were purposefully sampled to answer the research question. Specifically, the researcher identified members based on their relative amount of sea time and time in service to ensure a diverse sample. Members’ total time in service ranged from 2.5 years to 19 years. Sea time ranged from 1 year to 9.5 years.

Instrument and Data Collection

An interview script (Appendix B) with semi-structured questions was developed to investigate members' willingness to share knowledge, perceptions of trust and knowledge reciprocity in the afloat community, and disposition towards virtual learning. Interviews lasted between 15 and 45 minutes and were conducted behind closed doors in a conference room at USCG Headquarters to facilitate privacy. Follow-up questions were asked during the interview as needed to clarify responses or further explore the opinions presented by members. The interviews were recorded (with members' knowledge and consent as described in Appendix A) and then transcribed by the researcher.

Results

Interview responses were examined using the constant-comparative approach (Boeije, 2002; Glaser & Strauss, 1967; Lincoln & Guba, 1985). As advocated by Glaser and Strauss (1967), the researcher engaged in constant comparison by analyzing, coding, and consistently integrating codes within and between participant responses. Extensive memoing was employed when reviewing interview transcriptions to capture the researcher's thoughts on coding and categorization of data in a timely manner as themes emerged (Glaser & Strauss, 1967). Similar to Miles, Huberman, and Saldaña's (2014) perceptions of "jotting" notes, memos provided the researcher with a mechanism for taking an inventory of data collected, analyzed and categorized at different points in the research process.

The comparative analysis of interview data occurred in a layered approach, whereby interview data was initially reviewed independently. Boeije (2002) recommended a systematic approach to analyze interview data in which comparisons are

first made within a single interview response. The researcher reviewed individual interviews to get a sense of consistency and commonalities within each participant's statement and assign open codes (Boeije, 2002). Interview responses were then compared between participants to further define patterns and connect codes as themes emerged. By comparing different participant responses and emergent themes, the researcher established a rich description of participants' perceptions of knowledge-sharing, trust, and disposition towards virtual learning. Themes were compared to the researcher's experience and literature on VCoP development to enable thorough interpretation of findings and further categorization of data (Creswell, 2013; Merriam, 2009). The main themes found included (1) members' confidence in overall knowledge-sharing, (2) the influence of service reputation and subject matter in one's decision to share knowledge, and (3) overall willingness to share some types of knowledge virtually with a provision for anonymity.

All members expressed confidence in the afloat community's willingness to share knowledge. One member described the afloat community as "tight knit" and considered the exchange of sea stories, or anecdotal experience, to be a central tenet of the afloat community. One of the primary themes regarding knowledge-sharing, however, involved the influence of subject matter in afloat members' decision to share knowledge. Several members distinguished between operational knowledge and professional development knowledge. Operational knowledge was determined to be information regarding area-specific operations, qualifications, or patrol summaries. One member described this knowledge as "port call specific," and differentiated this type of geographic and logistical knowledge from that of professional development. Members considered professional

development knowledge to be a less formal type of knowledge, referring to this as “knowledge you need to get the job done” or “best practices” and “lessons learned.”

Noting that some members of the afloat community are more “risk-averse,” one member highlighted “professional vulnerability” as preventing individuals from sharing or reciprocating knowledge shared by others regarding mistakes or lessons learned. Several members referred to the afloat community’s reputation for “eating its young” and considered this type of negativity and hypersensitivity surrounding service reputation to prevent an open exchange of mistakes or lessons learned. One member noted, “I would definitely feel comfortable sharing something that went well over something that didn’t go well, but it depends on the situation.” The member went on to note that the decision to share knowledge would only be made after consideration of “what the risks are to my personal reputation.”

All members noted concern regarding the sharing of professional development knowledge, specifically regarding their own lessons learned and mistakes. They also considered this reluctance to be shared throughout the community. Two members specifically referenced a lack of tolerance for mistakes in the afloat world with one individual further detailing a “zero forgiveness mentality in the fleet...when sometimes things don’t work out, we don’t want to shed any more light on that path.” These opinions support the notion that reciprocity is negatively impacted when members are less willing to engage. As Lin et al. (2009) cautioned, knowledge-sharing is not reciprocated when members have doubts regarding the communal value of their knowledge. Although reputation and vulnerability may threaten reciprocity, members did express the belief that professional development knowledge, even when it involves

mistakes and potential vulnerabilities, benefits the greater community. This finding supports the concept of altruism, which Wasko and Faraj (2000) considered a key contributor to knowledge-sharing.

When discussing preferences for communication and willingness to share knowledge virtually, the desire for anonymity was expressed. One member stated:

I think it would be helpful to have something like that [virtual forum]...I think that we need a mechanism to do it that's non retribution and, of course, there will be judgment in there, but you can't judge the particular person by name. If you were to have a mechanism available like that, people might be willing to put their toe in the water.

Three members noted that anonymity would be helpful and would potentially provide "protection from scrutiny and...preserve career viability." Anonymity has the potential to positively influence both willingness to share knowledge and members' disposition towards online learning. Members' perceptions of anonymity in a virtual environment were explored in this case study.

The findings of the pilot study indicated that members of the afloat community were willing to share knowledge and perceived an opportunity to enhance knowledge-sharing and professional development, but the pilot study was limited to six participants. Additionally, the pilot study did not include the most senior members of the community who have significant leadership experience and time at sea. This case study will expand the participant pool to better reflect the opinions of the afloat community and to amplify members' opinions of trust and the desire for anonymity within a virtual community. Since trust is a major influence in knowledge-sharing, this case study is necessary to further explore perceptions of trust in the afloat community. The experience of senior leadership may provide a different perspective on communal trust since these members

have the greatest amount of exposure to the community. Similarly, these members may have a different perspective on virtual learning since this medium was not available for the entirety of their career as it has been for less experienced members of the community.

Context of Study

The afloat community includes a proud, close-knit group of professional mariners. This community consists of both officers and enlisted members of both genders, with a wide range of time in the service and time at sea. The USCG's afloat community is often compared to the U.S. Navy's (USN) Surface Warfare Community as both communities engage in rigorous training and qualification programs in support of professional maritime excellence. Like the USN's Surface Warfare Community, the USCG's afloat community is highly competitive. Afloat members aspire to achieve command of a ship. The selection process for command is highly competitive, and only a fraction of the members qualified for command actually attain this coveted position. In addition to being competitive, this community has minimal tolerance for mistakes. As affirmed by the pilot study, there is a perception that the afloat community eats its young, whereby members are held to extremely high standards and mistakes are often irrecoverable. These perceptions may influence members' trust and willingness to share knowledge about mistakes or professional lessons learned. Despite the utility and value of such information and its potential to enhance safety and prevent future accidents at sea, members may refrain from sharing this information to preserve their reputation. Concerns regarding service reputation may serve as a barrier to effective knowledge-sharing.

VCoP may augment learning and professional development opportunities within the afloat community. Afloat training relies heavily on a just-in-time, OJT approach,

whereby resident training is minimized to reduce members' time away from their units and create a more cost-effective, sustainable learning program. Although this approach may save time and money, it does not facilitate succession planning or knowledge management, which are especially critical to a community so reliant upon tacit knowledge. Unless their professional position entails afloat support, engagement, or management, afloat members may have limited opportunity to remain involved with shipboard operations when serving in staff tours.

Since a VCoP does not yet exist for the afloat community, this study concentrated on the afloat community's potential engagement in a VCoP. Although the specific features and parameters of the virtual learning environment have yet to be established, the potential VCoP referenced in this study was based on existing communities and available virtual learning tools within the USCG. Some communities of the USCG have recently started VCoP in an effort to consolidate knowledge and provide access to subject matter expertise. In the enlisted community, storekeepers, referring to the occupational specialty responsible for logistics and accounting, have a VCoP on the internal USCG internet. Their site includes professional development information, links to published references and knowledge repositories, and an asynchronous discussion board. A VCoP for the afloat community may possess similar types of information and functional attributes.

Participants

Participants for this study included active duty members of the afloat community that were serving in either staff tours ashore or in afloat tours on ships. Survey respondents were conveniently sampled from email distribution lists including members of the Surface Navy Association (SNA). Purposeful sampling was employed to select

interviewees to facilitate a comprehensive analysis of the research problem (Creswell, 2013; Merriam, 2009). Specifically, maximum variation sampling, whereby participants who represent diverse portions of the population were solicited for interviews (Creswell, 2013; Merriam, 2009). Interview respondents were purposefully sampled to reflect diversity of gender, sea time, and time in service represented by survey respondents. Interviewees were not solicited via SNA email distribution lists as the use of the distribution lists was authorized for survey solicitations only. Rather, the researcher emailed interviewees directly based upon their gender, rank, and job position to yield a varied sample of the afloat community. To protect their anonymity, the researcher did not ask interviewees if they completed the online survey. Two interviewees, however, remarked that they completed the survey and there is the potential that a greater number of respondents may have participated in both the survey and interview.

In an effort to capture the perspectives of more senior members of the afloat community that were not reflected in the pilot study, the researcher initially intended to solicit members with over ten years of sea time for interviews, but this tactic was altered after completion of the preliminary analysis of survey data. The preliminary review of survey respondents' sea time and time in service revealed that over 50% of respondents had more than 15 years of total service time and 35% of respondents had more than 20 years of total service time as demonstrated in Tables 1 and 2. Similarly, 20% of respondents had more than 10 years of sea time. Given the relative seniority of the respondent pool, the researcher purposefully solicited interviewees that had a broader range of experience rather than concentrating on more senior members for interviews. Afloat members were asked to participate through an email solicitation that included

background information on the study (Appendix E) and a document containing the interview questions (Appendix C) for their review and consideration. The distribution of interviewees' time in service and sea time is provided in Table 3.

Table 1 Survey Participants' Total Service Time

Range of Service Time	Number of Participants
< 5 years	3
5-10 years	3
10-15 years	10
15-20 years	9
> 20 years	14

Less experienced interviewees were required to have at least one year of sea time to ensure a minimum degree of exposure to the afloat community was reflected in this study. Open-ended survey respondents were not required to have a specific amount of sea time in order to maximize the number of responses received. Ultimately, all survey and interview participants possessed over two years of sea time.

Table 2 Survey Participants' Total Sea Time

Range of Sea Time	Number of Participants
< 2 years	0
2-4 years	4
4-6 years	8
6-8 years	6
8-10 years	13
> 10 years	8

Table 3 Interviewees' gender, sea time, and service time

Gender	Years of Service	Years of Sea Time
Female	23	12
Female	11	6
Female	19	5
Female	18	9
Male	29	10
Male	20	8
Male	22	11
Male	21	10
Male	14	7
Male	6	4
Male	21	8
Male	27	5

Interviewees were also solicited with an emphasis on increasing gender diversity since only six of thirty-nine survey respondents were women whereas four of twelve interviewees were women. Table 4 illustrates the gender breakdown of all survey and interview participants.

Table 4 **Gender of Survey and Interview Participants**

Gender	Number of Participants
Male	41
Female	10

Email distribution lists including members of the National Capital Region, Bay Area, and New London Chapters of the Surface Navy Association, along with pilot study participants and members who expressed interest in this study, were used to invite a diverse pool of afloat members to complete the open-ended survey. The National Capital Region and Bay Area Chapters of the Surface Navy Association were selected due to their relatively large membership sizes, as seen in Table 5. Although smaller, the New London Chapter was invited to participate due to its active membership and potential to further diversify the respondent pool. The Surface Navy Association is a voluntary professional organization dedicated to the education and development of the afloat communities of both the USN and USCG. The Surface Navy Association promotes meaningful engagement between academic, historical, and business sectors of the community to promote cooperation, awareness, and professional engagement (Surface Navy Association, n.d.). Anonymous survey links were emailed to approximately 180 members of the afloat community. This approximation is based on email distribution list sizes provided by the Surface Navy Association administrative staff and leadership of the

National Capital Region, Bay Area, and New London Chapters. The researcher maintained accountability of the distribution list of afloat members and pilot study participants who were emailed directly. Approximate distribution list sizes are provided in Table 5.

Table 5 **Size and Type of Distribution Lists Used to Email Anonymous Survey Link**

Distribution List Type	Membership Size
National Capital Region Chapter of Surface Navy Association	70
Bay Area Chapter of Surface Navy Association	70
New London Chapter of Surface Navy Association	22
Pilot Study Participants and Interested Afloat Members	18

Forty-seven survey responses were recorded out of the 180 members initially emailed, yielding a response rate of 26%. Thirty-nine of the original 47 responses were deemed complete. Incomplete responses are frequently encountered in open-ended surveys and may be a result of the greater level of effort required for participants to enter a detailed response as compared to that of close-ended surveys (Reja, Manfreda, Hlebec, & Vehovar, 2003). Due to the small participant population of this study and lack of existing research on the afloat community, surveys were considered complete if 50 percent or more of the questions were answered. This threshold for completion enabled

the researcher to retain 3 surveys that were between 50 and 75 percent complete and contained valuable data on the knowledge-sharing culture of the USCG's afloat community. 36 of 39 surveys were 100 percent complete. Maximizing the available survey data was critical to achieving rich description within this case study. With the exception of one survey respondent and one interviewee, participants were commissioned officers of the afloat community with varying degrees of experience and time in service.

Data Collection

This case study explored the afloat community's potential for VCoP engagement by answering the following research questions:

- How do members of the afloat community describe their willingness to share knowledge?
- How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?
- How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Data for this case study was collected through interviews and open-ended survey questions to investigate the afloat community's knowledge-sharing culture. Before commencing data collection, approval for this research protocol (IRB# 104-SB18-013) was obtained from Boise State University's Office of Research and Compliance. Table 6 outlines the data collection timeline for this study.

Table 6 Data Collection Methods and Timeline

Data collection methods	Timeline
Open-ended surveys	February 7 – March 30, 2018

Open-ended Surveys

Surveys constituted the primary source of data collection for this study, yielding 39 responses of afloat members stationed throughout the USCG serving on board ships and ashore at various staff and operational jobs. Open-ended survey questions offer the benefit of producing detailed information to support research (Creswell, 2014). An anonymous link to an online survey with 16 questions (Appendix D) was emailed to afloat members, including members of the Bay Area, National Capital Region, and New London Chapters of the Surface Navy Association, along with afloat members who participated in the pilot study and expressed interest in this case study. Table 7 lists the survey questions and the corresponding research questions that they support.

Table 7 Research Questions with Supporting Interview and Survey Questions

Research Question	Survey Questions	Interview Questions
1. How do members of the afloat community describe their willingness to share knowledge?	6. Describe how knowledge-sharing most frequently occurs in the U.S. Coast Guard's afloat community (over email, on the phone, in social settings, during classroom training, etc.).	2. Do you share knowledge frequently with other members of the afloat community? a. How? b. Do you share knowledge more frequently with the afloat community

<p>2. How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?</p>	<p>7. Describe how often you share knowledge with other members of the U.S. Coast Guard's afloat community.</p> <p>8. Describe how often you reciprocate the knowledge that afloat members share with you.</p> <p>9. Describe how often other afloat members reciprocate the knowledge that you share with them.</p> <p>10. Describe your comfort level with sharing mistakes or lessons learned with other members of the afloat community.</p> <p>11. Describe how you perceive other afloat</p>	<p>when stationed afloat vs. ashore?</p> <p>3. Do afloat members reciprocate the knowledge that you share with them?</p> <p>If so, is this reciprocation of knowledge important to you?</p> <p>4. Are you comfortable sharing mistakes and lessons learned with other members of the afloat community?</p>
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- members' comfort levels with sharing mistakes or lessons learned within the afloat community.
3. How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?
4. Describe how you perceive the afloat community's comfort level
5. Do you trust other members of the afloat community will respect knowledge shared regarding mistakes or lessons learned?
6. Describe your experience learning in a virtual forum.
7. Are you interested in sharing knowledge with other members of the afloat community in a virtual forum (blog post, online classroom, etc.)?
8. Are you comfortable sharing mistakes or lessons learned in a virtual forum (blog post, online classroom, etc.)?
12. Describe your experience with sharing knowledge in a virtual forum (blog post, online classroom, etc.).
13. Describe your comfort level with sharing knowledge in a virtual forum (blog post, online classroom, etc.).

- with sharing knowledge in a virtual forum (blog post, online classroom, etc.).
15. Describe your interest in sharing knowledge with other members of the afloat community in a virtual forum (blog post, online classroom, etc.).
16. How would the option for anonymous knowledge-sharing influence your willingness to share mistakes or lessons-learned in a virtual forum?
- a. Do you perceive that other members of the afloat community are comfortable sharing mistakes and lessons learned in a virtual forum?
- b. Would the option for anonymous knowledge-sharing make you more willing to share knowledge in a virtual forum? Why/Why not?

One of the benefits of virtual data collection is exposure to groups that would otherwise be inaccessible (Creswell, 2013). The use of email solicitations and an online

survey provided access to afloat members serving on board ships. Survey responses were stored on a secure server, and respondent anonymity was protected in accordance with Boise State University's Office of Research and Compliance.

Interviews

Case study research frequently relies on interviews to provide data for a rich description of the case (Creswell, 2013; Stake, 1995). Interviews provide detailed accounts of participants' diverse opinions and interpretations of the research question, providing the researcher with a variety of perspectives on a particular case (Stake, 1995). The researcher conducted one-on-one interviews of 12 members of the afloat community to detail the community's perceptions of trust, knowledge reciprocity, and disposition towards online learning. 10 of the 12 interviews occurred in person at USCG Headquarters in Washington, DC, and two interviews were conducted over the phone. The interview script (Appendix C) was adapted from the pilot study script to get general information on members' perceptions of knowledge-sharing, trust, reciprocity, and disposition towards online learning. Table 7 aligns interview questions with the research questions that they supported. Recognizing that interviewees may not directly adhere to the script, the semi-structured interview questions were open-ended to accommodate flexible responses (Merriam, 2009; Yin, 2014).

Upon review of survey responses, the semi-structured interview script was adjusted to facilitate further exploration of the potential differences between knowledge-sharing while afloat vs. ashore and gain additional insight into members' perceptions of reciprocity and its influence in the decision to share knowledge. These interviews were digitally recorded and transcribed by a professional transcription service. Survey and

interview data were analyzed using the qualitative research software, NVivo 11.

Participant anonymity was protected throughout the interview, analysis and reporting stages of this research.

As affirmed during the pilot study, interviews are an effective mechanism for getting highly detailed and potentially sensitive information on members' perceptions and experiences (Creswell, 2014). To facilitate open discourse and respect members' privacy, interviews occurred one-on-one in a quiet location. The researcher chose to conduct 12 interviews to significantly expand upon the information yielded during six interviews in the pilot study and adequately saturate the data. Creswell (2013) advocated that researchers collect enough information to identify themes and conduct "cross-case theme analysis" (p. 157). Although only one case is being pursued in this study, themes were explored between participant responses in interviews and open-ended surveys.

Data Analysis

Creswell (2013) separated the qualitative data analysis process into three segments, including data organization, coding and thematic development, and depiction of findings. Despite this seemingly systematic approach to analysis, one of the primary criticisms of the qualitative process is a lack of consistency, transparency, and disclosure of methods (Anfara, Brown, & Mangione, 2002). To ensure the integrity and rigor of this case study, each phase of the analysis process, commencing with data collection and organization, is presented in detail and illustrated using diagrams and process tables where appropriate.

To record and organize some of the analysis that occurs during the collection phase, Miles et al.'s (2014) method for "jotting" notes (p. 95) and conducting an interim

summary of the data collected was employed. Note-taking was particularly critical to the initial analysis of survey data and interviews, whereby the researcher recorded points of emphasis and developed a list of the top three most prevalent and impactful concepts imparted by the interview. These notes also laid the groundwork for the interim summary. The interim summary is intended to highlight potential research gaps and the need for additional data collection or analysis earlier in the research process (Miles et al., 2014). An interim summary was conducted as open-ended survey data was collected and initially coded to identify areas for additional exploration and research during the interview process. The interim summary also served as an opportunity to assess the different types of data and demographics represented within survey responses and respondents to ensure that one type of participant or data form was not being overly relied upon (Miles et al., 2014).

The interim summary produced two actionable results in this case study. While reviewing survey data, the researcher noted that a large number of respondents differentiated between how they shared knowledge while stationed afloat versus how they shared knowledge while stationed ashore. Specifically, when asked to describe how knowledge sharing occurs within the afloat community and how often they share knowledge, as per questions six and seven in Appendix D, the majority of respondents outlined frequencies and processes distinctive to either positions on ships or positions ashore. To illustrate this delineation, a mind map was created in NVivo 11 and is provided in Figure 1.

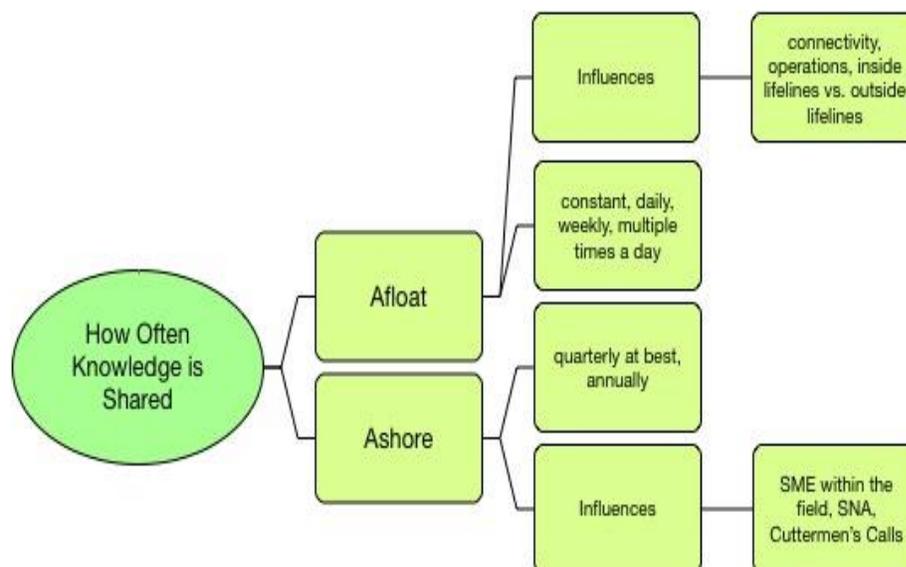


Figure 1. Mind map from NVivo 11 depicting afloat vs. ashore knowledge-sharing frequency and influences.

To gain additional insight into potential differences between knowledge-sharing ashore versus afloat, the interview script was updated to address knowledge-sharing medium and frequency when afloat vs. ashore. Additionally, the interim analysis revealed that the vast majority of survey respondents affirmed the reciprocation of knowledge in Questions seven and eight in Appendix D. Multiple respondents related the reciprocation of knowledge to “need,” “best practices,” and “helping out” and one specifically noted that knowledge-sharing is not “tit for tat.” To further explore the importance of reciprocity and its influence in knowledge exchange, the interview script was adjusted to more specifically address reciprocity, as noted in Table 8.

Table 8 Interview Questions Pre and Post Interim Summary

Pre-Interim Summary	Post Interim Summary
2. Do you share knowledge frequently with other members of the afloat community? a. How?	2. Do you share knowledge frequently with other members of the afloat community? a. How? b. Do you share knowledge with the afloat community more frequently when stationed afloat vs. ashore?
3. Do you believe that members of the afloat community share knowledge frequently with other members of the afloat community?	3. Do afloat members reciprocate the knowledge that you share with them? If so, is this reciprocation of knowledge important to you?

Analysis of Surveys and Interviews

As in the pilot study, interviews and surveys were analyzed using the constant-comparative approach (Boeije, 2002; Glaser & Strauss, 1967; Lincoln & Guba, 1985). The researcher engaged in constant comparison by analyzing, coding, and consistently integrating codes within and between participant responses (Glaser & Strauss, 1967). Survey and interview responses were first reviewed individually to highlight consistencies and similar themes within responses (Boeije, 2002). Survey and interview responses were then compared between participants to further refine themes and facilitate a rich description of the knowledge-sharing culture of the afloat community. Achieving a highly detailed description of the research, including participants and their responses, was

essential to this case study (Creswell, 2013). NVivo 11 assisted the researcher with the comparison and categorization of themes from interview transcriptions and survey responses. Specifically, this software aided the researcher in hierarchically organizing themes and enabled “graphical representation” (Creswell, 2013, p. 204) of thematic categories. NVivo 11 enhanced storage, organization, and ease of accessing data during the analysis phase of research. Additionally, NVivo 11 assisted the researcher in documenting a layered approach to data analysis in which survey and interview responses were analyzed independently prior to being compared to other participant responses. These layers are documented within the structural and pattern coding folders, along with demographic case folders stored in NVivo 11, and illustrated by the node folder on the left side of the screenshot in Figure 2. Analytic memos were also drafted and recorded within applicable coding folders in NVivo 11 demonstrated by the green notepad icon adjacent to the case listed as “10-15 years.”

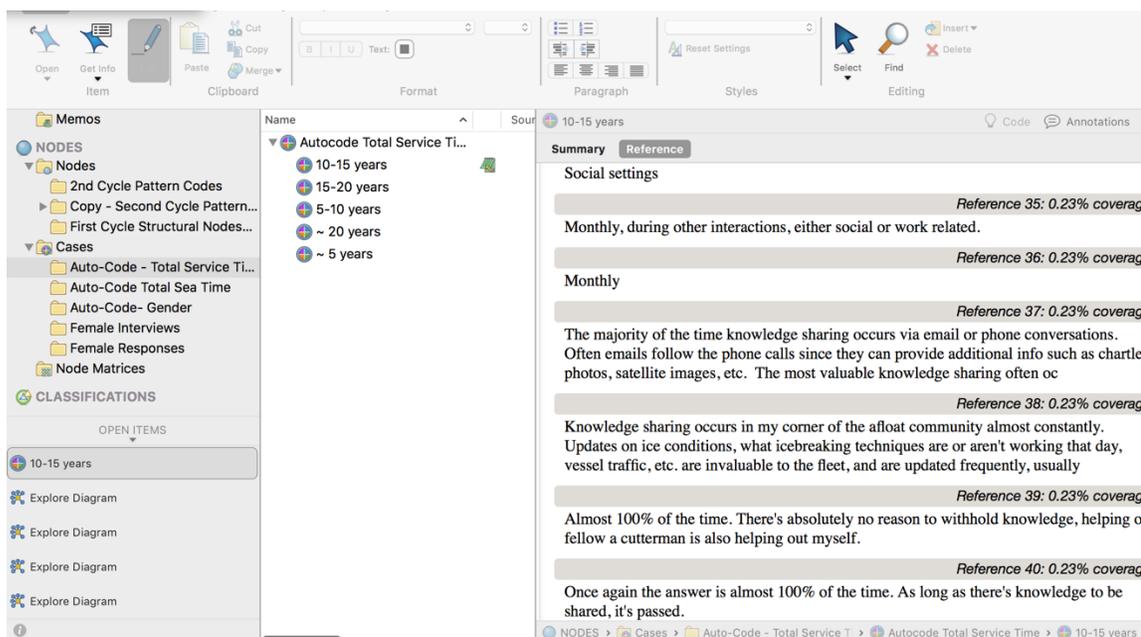


Figure 2. Screenshot from NVivo 11 depicting structural coding, pattern coding, demographic case folders and analytic memo link.

Coding

There were three distinct phases to the coding process employed within this case study, including first cycle coding, second cycle coding, and case coding comparisons. First cycle coding included the structural coding of survey and interview data, whereas second cycle coding included the pattern coding of survey and interview data. First and second cycle coding facilitated a holistic approach to data analysis and the generation of themes. The third phase of the coding process included the comparison of themes between demographic categories, or cases as referred to in NVivo, including gender, total time in service, and total sea time.

First Cycle Coding

Coding was an iterative process that began with open-ended survey data. The analysis of open-ended survey responses began while the survey was live to inform the interim summary and, most importantly, identify areas for further exploration during the interview process. Saldaña (2015) referred to initial coding as “first cycle” (p. 68) and subsequent iterations of coding as “second cycle” (p. 234). This terminology is applied to describe the coding strategy employed in this case study. Structural coding was employed as the first cycle coding technique, whereby data was coded at thematic nodes. Structural coding is particularly well-suited to the analysis of semi-structured data because it “codes and initially categorizes” (Saldana, 2015, p. 98) large quantities of data. Structural coding was employed during the initial analysis of both open-ended survey data and interview responses in which the survey and interview questions provided an initial organizational framework for coding and thematic node development. In NVivo 11, nodes are considered containers of data that can be organized according to concepts, themes, or

demographic descriptors (Edhlund & McDougall, 2016). Thematic nodes were initially generated based on the three research questions in this case study, addressing members' willingness to share knowledge, communal trust, and disposition towards online learning. Sub-nodes, addressing specific elements of the research questions included within the survey and interview responses were also generated during structural coding. For example, sub-nodes within the original disposition towards virtual learning node included anonymity, comfort level, experience level, and interest in sharing knowledge in a virtual forum. Subsequent iterations of structural coding resulted in the addition of sub-nodes and recoding of data based upon its relevance and relationship to other thematic nodes. For example, all survey data that addressed the forums and frequency in which members shared knowledge was categorized within the sub-nodes formal, informal, influences, and how often you share knowledge. Survey data was initially analyzed independently and sub-nodes were generated as smaller segments of data were reviewed and named according to the thematic concept that they supported. Figure 3 demonstrates the initial coding structure of survey data, including color-coded stripes, illustrating the density in

which a node or sub-node was supported by survey data.

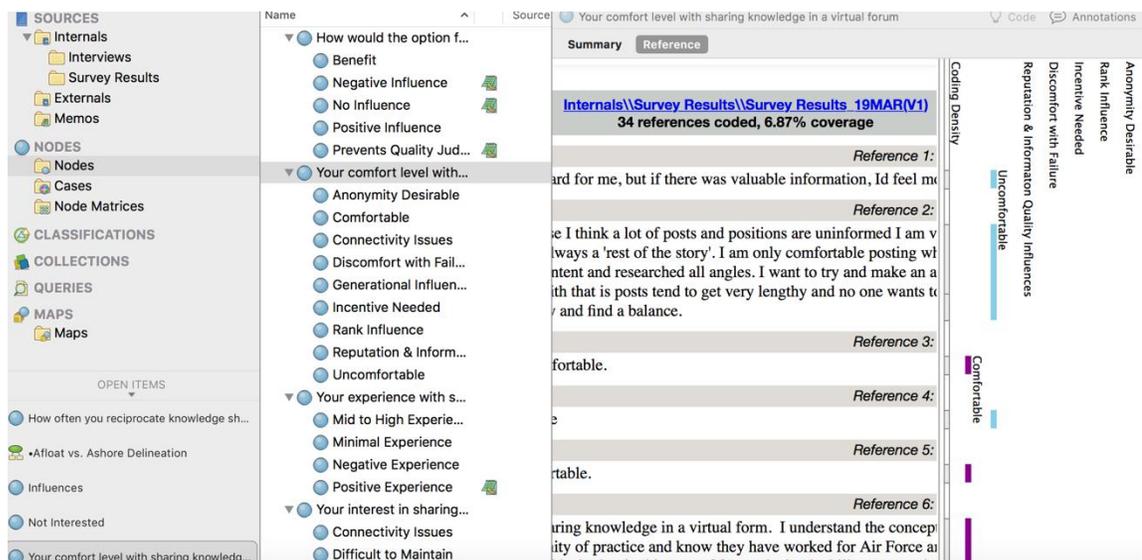


Figure 3. Screenshot from NVivo 11 depicting first round structural coding, references, memos, and coding stripes.

In vivo coding was also used throughout the analysis of both survey and interview data to capture particularly meaningful participant statements within the data. For example, one participant noted, “you are cut off from the afloat community until you are back afloat again.” Given the potential significance of this statement to understanding how, when, and why afloat members share knowledge, the direct quote was created as a sub-node within the thematic node, “how knowledge-sharing occurs.” In vivo coding enabled the researcher to identify initial points of emphasis for later analysis upon completion of first round coding. Additionally, in vivo coding helped to “honor the participant’s voice,” (Saldaña, 2015, p. 295) and reflect the level of understanding and detail required of case study analysis.

Structural coding, along with in vivo coding, was an effective first cycle coding technique because it was clearly bounded by the parameters of the study’s research questions and produced a hierarchical organization of themes (Saldaña, 2015). Saldaña

(2015) advised the first-cycle coding methods may be combined to create a “hybrid” (p. 74) approach, whereby two or more coding techniques are employed. Structural codes reflected the broader categorization of data during first cycle coding, whereas in vivo coding facilitated detailed, supporting codes that reflected afloat members’ unique experiences. Additionally, structural coding was well-aligned with this study’s concurrent data collection and analysis processes, facilitating a logical and defensible initial coding structure that remained dynamic and flexible enough to accommodate the large volume of data obtained from open-ended interviews.

Structural coding of survey data yielded 6 nodes and 24 sub-nodes, whereas subsequent structural coding of interview data yielded an additional 4 nodes and 172 sub-nodes. An initial codebook was retained in NVivo 11 as a folder of nodes to document the progression from structural coding to pattern coding and, ultimately, the development of themes. To demonstrate the richness and complexity of data provided by interviews, a diagram of thematic category, anonymity, and its supporting nodes, anonymity, is presented in Figure 4. After the initial structural coding of survey data, anonymity was classified as a sub-node under the node, disposition towards virtual learning, and was supported by three additional sub-nodes, or codes, negative influence, positive influence, and no influence. During the structural coding of interview data, anonymity was elevated to a top-level node, or major theme, due to the prevalence and complexity of this concept and supporting data, as shown in Figure 4. Twenty nodes were coded under, anonymity, after the structural coding of interview data.

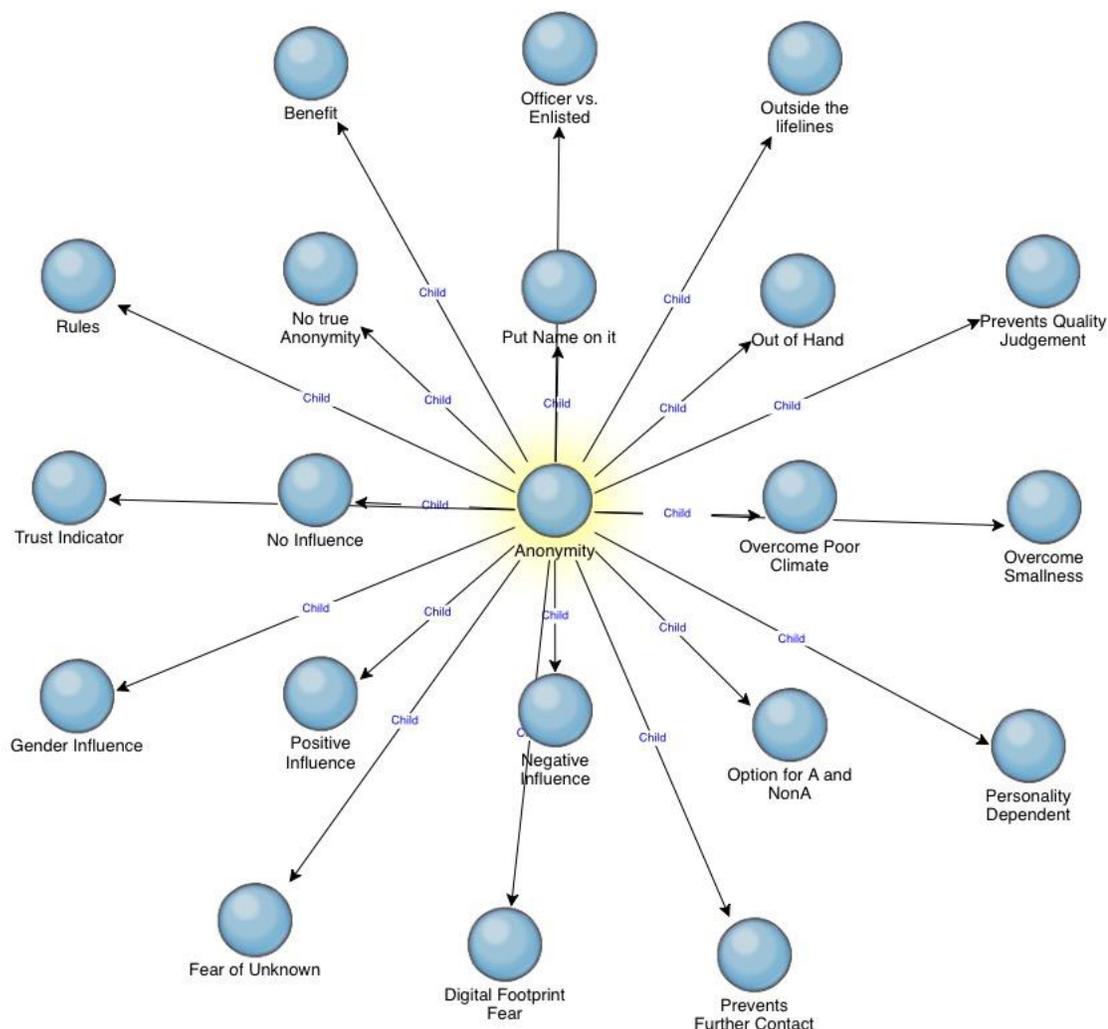


Figure 4. Explore diagram from NVivo 11 depicting structural codes supporting anonymity.

Second Cycle Coding

Second cycle coding is intended to streamline and categorize the original coding scheme, whereby major themes are developed and the overall number of codes is reduced (Saldaña, 2015). During the second cycle coding process, the total number of thematic nodes from survey and interview data was reduced from ten to five, including a thorough reorganization of sub-nodes. Pattern coding was employed during second cycle coding because it is explanatory in nature and is well-suited to reducing large quantities of data and examining similarities between codes (Miles et al., 2014; Saldaña, 2015). Pattern

coding was an intuitive process, whereby the researcher combined and reorganized similar thematic nodes into major themes. Pattern codes enabled the researcher to synthesize complementary structural codes that were initially supporting different research questions but were thematically connected. These themes were either generated from existing codes or new terminology was applied to reflect a broader categorization. For example, when creating pattern codes to describe members' experience with sharing knowledge in a virtual forum, the existing code, "brick and mortar preferred," was expanded to include all first cycle coding associated with members' preferences for face-to-face learning and perceived limitations of virtual learning. Coding associated with members' perceptions of virtual infrastructure issues, however, could not be linked to an existing code. Instead, the pattern code "virtual challenges" was created to include data surrounding limited access to virtual systems while underway, feedback concerns, and facilitation concerns.

A folder was created in NVivo 11 entitled, "Second Cycle Pattern Codes," in which the final coding structure was documented. In lieu of listing all of the initial and final nodes and sub-nodes, Table 9 demonstrates how data was condensed and reorganized into more manageable segments through the pattern coding process. The table contains the original structural codes on the right, along with subsequent pattern codes that were developed for the theme "your comfort level with sharing knowledge in a virtual forum" on the left. Pattern codes informed the development of the case study's major findings.

Table 9 Comparing structural and pattern codes supporting the thematic node, your comfort level with sharing knowledge in a virtual forum

Theme: Your comfort level with sharing knowledge in a virtual forum	
Pattern Codes	Structural Codes
Comfortable	Altruism
	Good participation
	If value added
Effective medium	If well-managed
	Retirement eligible
	Anonymity not desirable
Uncomfortable	Connectivity issues
	Push vs. pull
	Anonymity desirable
	Relationships
	Rank Influence
	Reputation and information quality

Case Coding Comparison

Unlike thematic nodes within NVivo, case nodes refer to groups of nodes that are categorized according to demographic or descriptive attributes (Edhlund & McDougall, 2016). In this study, case nodes were created as a mechanism for organizing all coded data according to gender, total time in service, and total sea time. Both survey and

interview data were classified into cases so that their codes and themes could be compared demographically. To facilitate a systematic comparison of coded data and identify trends within cases, node matrices were created in NVivo. Node matrices illustrate how one set of nodes relates to another set of nodes (Edhlund & McDougall, 2016). Multiple matrix queries comparing different themes from the second cycle pattern codes were used to determine whether similarities existed within or between members with certain experience levels, designated by sea time, time in service, or gender. Using gender as an example, the node matrix in Figure 5 demonstrates the different frequencies at which male and female survey and interview data were coded to describe anonymity and members' disposition towards virtual learning. The use of shading and numbers helped the researcher distinguish differences between the frequencies at which data was coded from a particular demographic group.

The screenshot shows the NVivo 'Matrix Query' interface. At the top, there are buttons for 'Run Query', 'Save Results...', and 'Save Query...'. Below this, the 'Adding Search Criteria' section shows 'All Sources' and 'Selected Items'. The 'Items in Selected Folders' section lists several nodes related to 'Disposition Towards Virtual Learning'. The main part of the screenshot is a matrix table with the following structure:

	A : Anony...	B : Benefit	C : Digital...	D : Fear of...	E : Gender...	F : Negati...	G : No
1	1	1	0	0	0	0	
1	1	1	1	0	0	0	
1	1	0	1	0	0	0	
1	1	0	0	0	0	1	
1	1	1	0	0	0	0	
1	1	0	0	0	0	1	
1	1	0	0	0	0	0	1
1	1	0	0	0	0	0	
1	1	1	0	0	0	0	
1	1	0	0	0	0	1	
1	1	0	0	1	0	1	

Figure 5. Screenshot of node matrix comparing frequencies of male and female data coded at the theme, anonymity.

In addition to matrix queries, text queries were also used in NVivo to determine the frequency at which a code was referenced by a particular demographic group. By comparing the number of times a particular word was applied by a group, the researcher was able to determine whether there were demographic trends related to particular themes. The primary benefit of establishing cases within NVivo was that it enabled the researcher to view all source data through the lens of a particular demographic group in a consolidated, repeatable manner. This consolidation, coupled with the tertiary sequencing of the case coding comparison, enabled the researcher to saturate the data before conducting a targeted analysis. Achieving saturation, whereby no additional thematic insights were gained from existing data, was a critical step towards answering the research questions (Lincoln & Guba, 1985; Saldaña, 2015).

Validity

Validation strategies refer to methods the researcher employs to enhance the accuracy of the study (Creswell, 2013). Triangulation, member checks, and placement of the researcher in the study validated findings. Triangulation enhances the validity of qualitative research (Creswell, 2013). Triangulation involves the use of different types of data to validate evidence and is considered both a requirement and strength of case study methodology (Creswell, 2013; Yin, 2014). Lincoln and Guba (1985) described how different sources and methods of data collection can be used for validation. In this case study, the use of interviews and surveys provided varied methods and sources of data for comparison and accuracy. Throughout the interviews, the researcher paraphrased participants' statements and opinions and to ensure accuracy. These member checks also

provided participants the opportunity to assess the researcher's data interpretations for accuracy (Creswell, 2014).

Creswell (2013) advocated that researchers clarify their bias within the study by describing opinions and experiences that may have impacted their interpretation of findings. As a member of the afloat community and training analyst within the USCG, the researcher's experience was central to this study and was the impetus for pursuing research on the knowledge-sharing culture of the afloat community. The researcher's experience and opinions are presented within this case study to ensure the audience is aware of this position and perspective (Creswell, 2013).

Summary

This case study included open-ended surveys and interviews to collect and triangulate data on the knowledge-sharing culture of the USCG's afloat community. Open-ended survey questions provided a greater volume of responses through which a larger portion of the afloat population was represented. One-on-one interviews provided more detailed responses from a purposefully sampled group of 12 afloat members with diverse amounts of sea time and time in service. This methodology was chosen to provide an in-depth examination of knowledge-sharing in the afloat community and to enable a thorough comparison between these findings and literature on knowledge-sharing culture. From this comparison, informed recommendations on potential VCoP development and sustainment will be presented in Chapter 5.

CHAPTER 4: RESULTS AND FINDINGS

The purpose of this qualitative case study was to explore how the knowledge-sharing culture of the afloat community is suited for VCoP engagement. The afloat community's knowledge-sharing culture encompassed members' overall willingness to share knowledge, perceptions of trust and knowledge reciprocity, and disposition towards online learning. Data was collected from 12 semi-structured interviews and an open-ended survey with 39 responses. This chapter presents the findings obtained from the analysis of all data. Major findings were derived through the consolidation of themes that emerged from each of the three research questions. This case study's themes included altruism, communal aversion to mistakes, perceptions regarding virtual efficiencies and infrastructure limitations, anonymity concerns, and the desire for management and facilitation.

Each of the three research questions is individually addressed by presenting the data from its corresponding survey and interview questions. Anfara et al. (2002) and Boeije (2002) recommended that qualitative researchers employ tables to document triangulation and comparative analysis. Themes, categories, codes, and supporting data are presented in tabular format to reveal the progression from data collection to analysis and synthesis of major findings. Tables documenting themes and supporting categories are used to introduce the findings of each of the three research questions. These themes are further distilled and compared in categorization tables that align themes with supporting codes and data sources within each of the three research questions. Saldaña

(2015) advocated that researchers group similar codes into categories to facilitate the development of themes. Categorization provided an intermediate step whereby the researcher organized pattern codes into categories that laid the foundation for thematic development and articulation of this study's major findings. These findings, along with implications for practice and research, are summarized in Chapter Five to make an informed recommendation on the afloat community's potential engagement in a VCoP.

Research Questions:

- How do members of the afloat community describe their willingness to share knowledge?
- How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?
- How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Research Question One

Research question one addressed how members of the afloat community describe their willingness to share knowledge with other members. Data was collected through survey and interview questions outlined in Table 10 that highlighted the frequency and forums in which members share knowledge, along with their perceptions of knowledge reciprocity.

Table 10 Research Question One with Supporting Interview and Survey Questions

Research Question	Survey Questions	Interview Questions
1. How do members of the afloat community describe their willingness to share knowledge?	6. Describe how knowledge-sharing most frequently occurs in the U.S. Coast Guard's afloat community (over email, on the phone, in social settings, during classroom training, etc.).	2. Do you share knowledge frequently with other members of the afloat community? a. How? b. Do you share knowledge more frequently with the afloat community when stationed afloat vs. ashore?
	7. Describe how often you share knowledge with other members of the U.S. Coast Guard's afloat community.	3. Do afloat members reciprocate the knowledge that you share with them? If so, is this reciprocation of knowledge important to you?
	8. Describe how often you reciprocate the knowledge that afloat members share with you.	
	9. Describe how often other afloat members reciprocate	

the knowledge that you
share with them.

Affirming the results of the pilot study, members explained that they shared knowledge with the afloat community through a diverse variety of tools and frequencies. The themes and supporting categories and codes are outlined in Table 11.

Table 11 Themes and Supporting Categories from Research Question One

Themes	Categories
<p>Knowledge-sharing in the afloat community is driven by need and occupational parameters</p>	<p>Knowledge-sharing occurs routinely within the afloat community.</p> <p>Knowledge-sharing is influenced by the need for a particular type of information.</p> <p>Members share knowledge with the afloat community more frequently when stationed afloat or in an ashore position involving afloat operations</p>
<p>Informal knowledge-sharing is preferred throughout the afloat community, but</p>	<p>Informal knowledge-sharing is preferred throughout the afloat community, but</p>

members' preferences for knowledge-sharing forum may depend upon their age.

members' preferences for knowledge-sharing forum may depend upon their age.

Members share knowledge through a combination of formal forums (classroom training/USCG managed knowledge-repositories) and informal forums (virtual, face-to-face, and phone conversations).

Members related formal forums to the exchange of foundational professional knowledge.

Informal knowledge exchange was more highly regarded than formal knowledge exchange.

Members perceive generational influences in preferences for formal vs. informal knowledge-exchange forums.

Altruism promotes knowledge reciprocity in the afloat community, whereas rank

disparity and afloat culture may limit knowledge exchange

Altruism and the desire to help others motivates knowledge-sharing in the afloat community.

Rank influence may limit knowledge reciprocity, whereas interpersonal networks may increase knowledge reciprocity.

Afloat culture and fear of attribution may limit knowledge reciprocity.

Frequency

All participants acknowledged some degree of knowledge sharing with other members of the afloat community, but there was variation in the frequency of sharing and its influences as outlined in Table 12.

Table 12 Theme with Supporting Categories and Data Detailing the Frequency of Knowledge-sharing in the Afloat Community in Research Question One

Research Question 1: How do members of the afloat community describe their willingness to share knowledge?

Theme: Knowledge-sharing in the afloat community is driven by need and occupational parameters.

Categories:

- Knowledge-sharing occurs routinely within the afloat community.
- Knowledge-sharing is influenced by the need for a particular type of information.

-
- Members share knowledge with the afloat community more frequently when stationed afloat or in an ashore position involving afloat operations.
-

Pattern Codes: Frequently; infrequently; afloat needs; higher frequency afloat; job or role influence; only while afloat; pro dev ashore; tactical info afloat; “you are cut off from the afloat community until you are back afloat again”

Sample Survey: “Frequently;” “constantly;” “When I am actively afloat, I share
Quotes: knowledge or seek out knowledge on an almost daily basis.
When I am not operational, I find myself not as involved in the community or providing knowledge to others who are actively afloat;” “Constantly. I am currently a CO afloat,” “Within the confines of the existing afloat unit,” “When assigned to cutter;” “Frequently when in a billet afloat (weekly). Less when outside the community;” “daily occurrence;” “While assigned to an afloat unit, every day inside the lifelines. Outside the lifelines, it depends upon the task at hand.”

Sample Interview	“Not frequently;” “medium amount;” “driven by need;” “When
Quotes:	I was afloat, yeah most of the people I was talking to on shore were afloat, ashore people;” “Ashore I do not know of anybody ... I have yet to receive any information from somebody ashore, helping me, or knowledge sharing with me, and I know that I didn't do it when I was ashore;” “In shore assignments, it's been mostly role-based that was driving those things. So I still communicate openly with the afloat community now, but far less over email than I used to;” “I think being in this office environment that I'm in right now, it seems to be job dependent honestly;” “Not so much ashore even though we have cutter men, and many of them, stationed here. The afloat community is not something you're discussing on a daily basis, obviously, or even weekly, unless somebody has a problem issue that you're raising.”

The majority of survey and interview participants expressed that they share knowledge on a routine basis. Survey responses included, “frequently,” “monthly,” “daily,” and “constantly” when describing sharing periodicity. One member noted, “Knowledge-sharing is a continuous and never-ending activity. Each interaction with superiors, peers, or subordinates are always opportunities for knowledge-sharing. From telling sea-stories, critiquing work products, obtaining opinions or advice, etc., it can be non-stop.” This description is rather broad, detailing a wide range of instances in which

knowledge is shared. Other members were more specific when detailing how often they share knowledge, noting:

Knowledge sharing occurs in my corner of the afloat community almost constantly. Updates on ice conditions, what icebreaking techniques are or aren't working that day, vessel traffic, etc. are invaluable to the fleet, and are updated frequently, usually from CO [Commanding Officer] to CO, SOPA [Senior Officer Present Afloat] to other units, or directly from TACON [Tactical Control].

This description detailed a specific type of information required to complete ice-breaking operations which is a unique mission with a specific quantity and quality of experience required of operators. Similarly, another member described tactical engineering information that is essential to completing an underway patrol. This member explained:

If my ship is looking to do something different, I usually ask the other ships how they are doing it. Likewise, if I come up with a new fuel burn calculator for instance, I pass it on to the rest of my shipmates.

Both of these examples noted a specific type of information, which was a common theme throughout participant responses that indicated knowledge-sharing occurred on a frequent basis. Afloat members who described sharing knowledge frequently noted instances in which a particular piece of information was exchanged or specifically sought out. These instances were described as involving navigation, ship-handling, port calls, and specific mission sets such as engineering and ice-breaking as detailed above.

The participants that described their knowledge-sharing periodicity as less than frequent used the terms “medium amount,” “not too often,” and “low” to explain the frequency of exchange. Only two interviewees and four survey respondents expressed infrequent knowledge-sharing with the afloat community. One member noted that

knowledge was exchanged “annually,” which was significantly less frequent in comparison to those members who described exchanges occurring at multiple points throughout the day. A common theme described by those who shared knowledge less frequently was the need to share or lack thereof. One member explained, “It tends to be like putting out a fire. When an issue comes up, either for me or for another afloat member of the community, they will solicit for information.” Other members who expressed less frequent knowledge-exchange described responding to specific prompts. One member described sharing periodicity as, “Not too often. Generally, when a question is asked on a distribution group.” This member described a specific instance in which information was shared through an email distribution list in response to a specific inquiry. Further supporting the concept of targeted knowledge-sharing, another member noted, “But every now and then, maybe once every two to three months, an XO [Executive Officer] will share a piece of information that's good to just know, not requesting anything.” This member’s statement implied that knowledge-sharing is a directed activity and more frequently an effort intended to produce a specific piece of information, rather than generate additional knowledge for the purpose of communal benefit. The members’ comment suggests that sharing rarely occurs without a specific impetus or need to know information. References to targeted sharing were more prevalent among those participants who noted less frequent knowledge-exchange than by the majority of members who shared knowledge more frequently.

Afloat versus Ashore Influences

In addition to relating their knowledge-exchange to either a specific type of information or need, members drew a critical distinction between afloat and ashore

information exchange when describing frequency. Specifically, when asked how often they shared knowledge, over one-third of study participants prefaced their responses by describing whether they were stationed afloat or ashore. This was especially poignant within open-ended survey responses where members were only asked to describe how often they exchange knowledge with other members of the afloat community. The question was agnostic with regard to whether members were serving afloat or ashore at the time of the knowledge exchange. Despite the lack of specificity, multiple members prefaced their responses with “When in an afloat job,” “When I’m afloat,” or “I’m currently assigned ashore.” One member explained:

When I am actively afloat, I share knowledge or seek out knowledge on an almost daily basis. When I am not operational, I find myself not as involved in the community or providing knowledge to others who are actively afloat. It is almost like you are cut off from the community until you are back afloat again.

This member described a reduction in communal engagement when serving ashore that other participants echoed in both survey and interview responses. There was a clear delineation between the frequency of knowledge-sharing that occurs when stationed on a ship versus the frequency that occurs when members are stationed ashore, which the participant above referred to as being “not operational.”

Similarly, another member noted that competing interests and professional demands may limit afloat knowledge-sharing to occurring strictly out of necessity. This member explained:

I feel like the desire to share information is often driven by need, which is just an observation of mine. I don't have any empirical data...but I've found that those people [afloat members] are so busy, and they've got so many people to communicate in so many different areas of the Coast Guard, whether it be the product line, LANT AREA [Atlantic Area], their family, family members of other people on the ship, members that aren't underway with them, whatever. Their support network. Their whole network. They're constantly in comms. So them

reaching out to you was when they needed something from you or you needed something from them and you know, that whole push/pull. A lot of times it was driven by like, "Hey, do we have something coming up, work-related, that we need to accomplish?"... If we didn't have a dockside coming up in six months that we're planning for, an event, a milestone, I probably wouldn't be talking to them nearly as much.

This member's statement highlighted the challenges associated with being afloat and the potentially reactive nature of information sharing. The member's statement also drew a unique distinction between the time constraints and limited bandwidth that afloat members have while stationed afloat as opposed to being stationed ashore. Due to increased professional demands and various communication obligations from various "networks" as this participant detailed, afloat members may be more likely to share information only as needed or when a specific prompt for information exists.

Interestingly, however, this member did note that he contributed knowledge frequently to the afloat community but drew an immediate distinction between communal knowledge-sharing while stationed afloat versus communal knowledge-sharing while stationed ashore.

While the specific frequency varied between participant responses, the vast majority of participants noted that they share knowledge more frequently when stationed afloat. Specific time frames associated with sharing afloat vs. ashore were mixed. One member noted, "When in an afloat job, this exchange happens daily. When assigned to shore duty the exchange is quarterly at best." Other members stated that they neither received nor provided information while stationed ashore and considered this to be a behavioral standard within the community. One member stated, "I have yet to receive any information from somebody ashore, helping me, or knowledge sharing with me, and I

know that I didn't do it when I was ashore.” Overall, afloat members confirmed that they share knowledge less frequently when stationed ashore, but noted some instances in which this information exchange was more prevalent.

Job and Rank Influence

Participants described the influence of certain job functions and responsibilities on the frequency of their knowledge-exchange ashore. Specifically, members explained that being stationed in a specific office, such as Cutter Forces, or an afloat training unit increased the amount of information that they exchanged with the afloat community. One member noted:

Yeah, there's definitely a difference with interaction when you're afloat versus when you're ashore. One of my ashore tours was actually in Cutter Forces, so all of my co-workers were cuttermen and we were dealing with all of our day jobs, and everything we talked about was mostly about cutters. There was a lot of information, knowledge sharing going on there that was atypical of my other shore jobs.

This member explained that job requirements dictated continuous engagement with members of the afloat community, but that this type of engagement was not typical of a staff tour. When describing knowledge exchange while stationed ashore, another member stated that this exchange was “job dependent” and related to the specific requirements of an ashore position. Similarly, another member detailed knowledge exchange with the afloat community as dependent upon “where I sat, you know what was my job? I would say now a lot of my discussions on the afloat stuff has to do with personnel...because that's more of what we see.” This member’s statement emphasized the different types of afloat knowledge exchanged in ashore positions and how this information may be influenced by one’s job requirements. While the Office of Cutter

Forces deals more frequently with mission execution and operational parameters of the afloat community, other positions involve afloat administration or personnel management, which entail very different discussions and areas of influence.

Some members felt that the ashore environment was more frequently where professional development information was exchanged. One individual noted:

I can go find people in the office and have that face to face conversation. It's career advice for the most part, but when I'm afloat it's more operational type information that we're exchanging, or how to do drills, or navigation standards. That sort of thing.

Although this individual did not clarify why he considered professional development more likely to occur ashore, other members identified a host of operational demands and limited free time that reduced knowledge-sharing opportunities while underway. One member felt that underway knowledge-exchange was influenced by the type of ship on which one served. The member explained:

There's two types of sharing and we probably need to define that. Sharing can be peer-to-peer, MECs [Medium Endurance Cutters] to MECs, HECs [High Endurance Cutters] to HECs, and the WMSLs [National Security Cutters], and then the patrol boat groups. They're all talking, as you know, amongst each other dealing with whatever issues, operations they're doing on a daily basis. There are groups that way.

Each of these groups, as detailed above, are involved with the operational intricacies of their particular type of ship and are more likely to be concerned with specific types of operational information. This specific information demands may, therefore, reduce the opportunity for professional development and interpersonal knowledge-sharing, potentially supporting the assertion that professional development occurs more frequently while members are stationed ashore.

Some members also noted that the frequency and type of information exchanged ashore were influenced by rank. Several members noted that the exchange of information was sometimes one-sided for the more senior individual. One member noted:

Right, but I think as a senior, you don't expect a give/take, you expect a give. That's the whole point, training the people behind you. But when you're out there or if you're dealing with peers, it's always a give/take. You're having conversations, "Hey, I'm dealing with this. How did you deal with it? How would you deal with it?" Talking to people that you trust, admire, think they'd make the right choices. You want those ongoing conversations that shares information. Two different relationships.

Hence, in professional exchanges between members of disparate ranks, there may be an expectation that the senior member is giving information, rather than receiving it. This may limit the amount of information shared by the junior member, recognizing that his role may be receiving as opposed to transmitting information. However, the wealth of available information from the senior member may have also been the impetus for the junior member to reach out. Members noted that seniority increased the overall amount of information that they shared, noting that as their time in service increased, so did the amount of information that they had to provide to others.

Forum

When asked to describe how knowledge-sharing occurs within the afloat community, most members offered a combination of forums in which they exchange information. One survey respondent itemized the forums according to the frequency in which they are used, explaining "In the following order starting with most frequent: over email/ chat, phone, sharing stories while catching up, training courses." Members consistently described a combination of face-to-face and virtual tools used by the afloat community to share information. The virtual piece was limited to email and existing

online repositories of information, but these tools were repeatedly referenced by members. Throughout the analysis process, two types of forums emerged, including formal and informal forums. Themes surrounding knowledge-sharing forums and supporting data are listed in Table 13.

Table 13 Theme with Supporting Categories and data detailing knowledge-sharing forums in the afloat community in research question one

Research Question 1: How do members of the afloat community describe their willingness to share knowledge?	
Theme: Informal knowledge-sharing is preferred throughout the afloat community, but members' preferences for knowledge-sharing forum may depend upon their age.	
Categories:	
	<ul style="list-style-type: none"> • Members share knowledge through a combination of formal forums (classroom training/USCG managed knowledge-repositories) and informal forums (virtual, face-to-face, and phone conversations). • Members related formal forums to the exchange of foundational professional knowledge. • Informal knowledge exchange was more highly regarded than formal knowledge exchange. • Members perceive generational influences in preferences for formal vs. informal knowledge-exchange forums.
Pattern Codes:	Informal; formal; social settings; afloat needs; higher frequency afloat; job or role influence; only while afloat; pro dev ashore; tactical info afloat; "you are cut off from the afloat community until you are back afloat again"
Sample Survey	"Generation Text;" "Casual conversations;" "some formal
Quotes:	knowledge sharing during POPs and PCO/PXO school;" "And then use of CG Portal pages like LANT portal page which has lessons learned, key documents, templates, etc.;" Finally, and likely most effective, is the informal social gatherings that occur

both when assigned to a ship and other units;” I learned the least from classroom training. The most through personal interactions with a diverse audience and some through phone and email”

Sample Interview
Quotes: “I will say that because I'm dated, that IM thing we all have now, that only came to be probably about 10 years ago, that has bridged that gap somewhat;” “IM is less formal;” “Usually over the phone, occasionally in person and probably frequently over email, particularly to deployed units;” “If something was truly something that you can learn a lesson from, it would be a mishap and I'd be required to communicate it anyway, and everybody has access to the mishap board in the operational community;” “Typically either over pints at a bar”

Formal forums included those that were rooted in existing professional training or managed by the USCG, including resident courses and the USCG portal, an online repository of information. Professional teams and qualification boards were also referenced as formal forums of knowledge-exchange. One member explained, “IPTs [Integrated Process Teams] are a great way to share. Additionally, functions such as the OIC [Officer in Charge) Review Board Colleges have been a source of collaboration extending across afloat/response communities.” Informal forums included email, social engagement, instant messenger, and phone conversations. One member described a

progression of knowledge-sharing within the afloat community, detailing the function and objectives of a variety of formal and informal communication forums:

There are three stages to knowledge sharing in the cutter community. The first stage occurs during the formal training stage when the various incoming leadership of the cutter community gather at PCO/PXO class. There is a combination of directed knowledge sharing (i.e., the curriculum) and informal knowledge sharing (brown bag lunches, seminar elements of the course and after-hours sea stories). The second phase occurs upon reporting, the more localized network is explored and built, there are formal elements of this network (chain of command) and informal ones (peers at co-located units). The third phase of knowledge sharing occurs organically through the never-ending cycle of the qualification process; this cycle is always in motion and often leads to stronger internal networking and knowledge sharing as well as email-based cross-unit knowledge sharing for best practices or to see if anybody in the community has seen the issue you may be dealing with.

This member connected formal and informal knowledge-sharing forum with members' experience levels, noting that knowledge-sharing begins in a classroom setting and progresses to less formal types of sharing as members gain experience and comfort with respective networks. The association between formal knowledge-sharing forums and foundational knowledge was a theme throughout members' descriptions of knowledge-sharing forums.

Formal Forums

Formal knowledge-sharing was referenced by multiple members as involving specific resident courses, including Prospective Commanding Officer (PCO)/Prospective Executive Officer (PXO) courses. One member explained, "Traditional classroom setting is used during pre-orders phase for cutter command cadre in the form of prospective operations officer or prospective commanding officer/executive officer courses." These courses are preliminary requirements for members who are pursuing command cadre positions and involve diverse curricula to accommodate multiple responsibilities and

positional variety. Some members only referred to formal knowledge-sharing forums when describing how knowledge-sharing occurs. One member quantified these forums and their respective knowledge-sharing contributions, explaining “10% PCO/PXO, or other formal school, 20% Written communication (CGMS [USCG Message System], newsletter, etc.), 20% CGPortal [USCG Portal] and CGINST [USCG Instructions], 25% email, 25% face-to-face.” This member attributed 75 percent of knowledge-sharing to formal means, including schools, online repositories, and publications. Additionally, this member referenced the USCG message system, which includes administrative reports or policy updates of an urgent, but temporary nature. The message system was recently modernized, but afloat members continued to reference “mishaps” as a formal mechanism for sharing knowledge. Mishaps, similar to accident reports, transcended the boundaries of formal and informal knowledge-sharing forums and were viewed as a means to both officially report information and prompt additional conversation. One member explained:

Many times what spurs on an email conversation or an email shout out to a group is a mishap report, where we are Monday morning quarterbacking...that mishap report and being like, "What do you mean by this? And did I get something wrong, how is the ship traveling this?"

This member described how a formal knowledge-sharing mechanism stimulated informal discussion, which may have been more valuable than the mishap itself. This statement also reflected a theme involving the questionable efficacy of formal knowledge-exchange.

The prevalence and use of formal knowledge-exchange were confirmed by repeated references to classroom training and USCG-sponsored publications, directives,

and online repositories. However, the value of formal knowledge-exchange was not highly regarded by all members. One survey respondent explicitly stated, “I learned the least from classroom training. The most through personal interactions with a diverse audience and some through phone and email.” Although specific reasons why classroom training may have been a less highly regarded source of knowledge-exchange were not referenced in multitude, one member did consider rank to be a negative influence. This individual stated, “Formal knowledge sharing occurs when instructions or directions are passed down via chain of commands or from Product/Asset Lines (Unfortunately, this tends to be mostly uni-directional, down the chain of command).” This statement implied that feedback from junior learners was not necessarily solicited or received, limiting the exchange of knowledge. Other members noted the need for hands-on engagement for learning ship-handling and the use of on-the-job (OJT) training. Although much of the USCG’s OJT is now structured in content and delivery, the process is more hands-on and inherently less formal than resident instruction.

Informal Forums

Two informal forums for knowledge-exchange emerged as members described their mechanisms for sharing knowledge with the afloat community. Virtual forums, including email and instant messenger, and face-to-face forums, including social engagements, OJT, and phone conversations. Phone conversations were classified as face-to-face because members described phone calls as being non-virtual sources of knowledge-exchange frequently employed by afloat members. Phone calls were regarded as the most effective mechanism to replace or augment a face-to-face engagement. One member explained, “We do not have a discussion forum, like a live discussion forum,

although I would have loved to have had that... Everyone liked to pick up the phone and call.” Phone calls were also referenced as the forum of choice when describing particular types of sensitive information or instances where members desired a more intimate exchange, specifically regarding mistakes or lessons learned. One member explained, “I think the telephone is still most frequent, particularly when discussing complicated or very specific evolutions/events. Direct voice communication limits the potential for confusion or misinterpretation, and conference calling has made it even more effective.” Afloat members’ preference for informal and flexible communication forums, such phone conversations, was prevalent among the majority of participants.

One member relayed the importance and various applications of informal knowledge-sharing in the afloat community as follows:

Knowledge sharing happens in many different environments - phone, email, social settings, conversations between fellow COs - but it is all mostly informal. There is some formal knowledge sharing during POPs and PCO/PXO school. You also have the opportunity to build a small network with other cuttermen during these formal schools. I know that I received a lot of knowledge, advice, and feedback by meeting up and talking with my peer COs that were stationed in the same port as I was. We would meet up often over coffee and lunch to share information, lessons learned, and best practices.

This member described informal knowledge-sharing in terms of networks and social exchanges. Although these instances were mentioned throughout members’ description of informal knowledge-sharing, more specific professional applications were also discussed. Members noted that the qualification process was facilitated by informal knowledge-exchange, including hands-on demonstrations and exercises in support of professional qualifications. One member detailed:

I believe that in our community the most common practice for practical ship driving knowledge transfer occurs on the bridges of ship. We communicate in

very small groups in this manner and have the ability to give very focused instruction. However, once we leave the realm of actual ship driving, I believe that meetings amongst peer groups, mentors, mentees, etc. is a primary way of sharing knowledge.

Face-to-face meetings and conversations were consistently referenced as highly valued methods for information exchange throughout the afloat community. Members explained that “sea stories,” were typically passed during casual conversations and that this type of colloquial exchange was critical to sharing information within the community.

When describing virtual knowledge-exchange, however, email was the preferred forum. One member explained:

E-mail is the principal sharing method. When I was CO [Commanding Officer] and XO [Executive Officer] in the Pacific WHEC-378 fleet, the staff at PACAREA [Pacific Area] maintained CO and XO "banglists" where one could easily share a best practice or ask advice among peers in the fleet.

Multiple members referenced email distribution lists that were organized according to position, ship platform, geographic location, or some combination of these attributes. Email distribution lists facilitated targeted knowledge-exchange between members experiencing similar situations and afforded rapid access to the community. One member explained, “email seems to be a great way to quickly pass information throughout the fleet. I can ask a question...to every OPS boss [Operations Officer] on a class of cutter and usually get at least 3-4 answers within an hour.” Email was the primary virtual knowledge-sharing forum referenced by afloat members due to its accessibility and assistance in overcoming geographic challenges that arise from members being underway at sea or stationed in a different location. One member

explained, “I got a lot of emails from people too because Alaska, we're so far apart.”

This member went on to explain that now, even though she is stationed ashore, she continued to get regular email from members stationed on her previous ship, emphasizing the utility and communal reliance on email for knowledge-exchange.

Although most members described email as a less formal means of communication involving informal inquiries between members, it was considered more formal than instant messaging, the other primary virtual forum. Members consistently referenced skype or instant messenger when describing virtual knowledge exchange. One member noted, “I think email is the most commonly used. Second is a tie between chat/IM [Instant Messenger]/Skype and voice calls.” In terms of availability, email is more consistently available for members while underway, but some considered it more time-consuming. Regarding formality and level of effort required for email, one member explained, “IM is less formal, and that emails are like, "this could be documented." Although we both know that IMs are recorded if you set your account up for that.” This member’s comment alluded to concerns members may have with their knowledge exchange being recorded. The potential for this information to be recorded may also contribute to a greater level of effort and caution applied to drafting emails. This member further described:

Email, we could spend some time crafting, being very guarded about what we said. In the virtual conversations that you're having face-to-face over a digital means, you may not be as inclined to hit pause and think about what you're getting ready to say, so you have to be careful about what you're sharing virtually within the afloat [community].

It is important to note that contentions regarding level of effort and formality of email vs. instant messenger were limited in quantity, but they may indicate challenges with communal trust, which is further explored in research question two.

Members' comments regarding instant messenger highlighted a theme regarding generational inclinations and, more specifically, the influence of age on communication preference. Instant messenger is a relatively new communication capability within the USCG, popularized within the past five years. One member with over 27 years of service explained:

I will say that because I'm dated, that IM thing we all have now, that only came to be probably about 10 years ago, that has bridged that gap somewhat, because I'll be at my desk, I would say probably two, three times a month, so almost maybe once a week, I'll get an IM from one of my "kids" and say, "Hey Master Chief, I need help with this, or how do I find this?"

Similarly, another member with over 20 years of service noted, "As my generation leaves the service though, I'd imagine email/online comms will quickly take precedence." This individual clearly acknowledged that younger members of the USCG prefer virtual communication. Younger afloat members echoed this sentiment. One member with less than 10 years of service described himself as a member of "generation text." Virtual preferences of younger members were referenced in regard to both email and instant messenger, but a clear preference of junior members for instant messenger versus email was not ascertained. One member with less than 10 years of service time affirmed, "Depends on the age group; but to me and my younger age group email seems to be a great way to quickly pass information throughout the fleet." Online repositories of knowledge, representing more formal virtual communication forums, were not

referenced with generational regard, nor were any demographic themes noted in relation to these forums.

Reciprocity

In addition to exploring the frequency and forums in which members exchange knowledge, research question one addressed the influence of reciprocity in members' willingness to share knowledge reciprocity. In accordance with Social Exchange Theory (SET), reciprocity implies that CoP members return the knowledge and benefits that they receive from others (Blau, 1964; Cheung, Lee, & Lee, 2013; Lin et al., 2009). Data analysis from research question one qualified whether members reciprocate knowledge and perceive communal reciprocity. Themes that emerged surrounding reciprocity included altruism, afloat vs. ashore distinctions, rank and network influences, and operational specialty dependencies. Themes and supporting survey and interview data are outlined in Table 14.

Table 14 Theme with Supporting Categories and Data Detailing Knowledge Reciprocity in the Afloat Community

Research Question 1: How do members of the afloat community describe their willingness to share knowledge?	
Theme: Altruism promotes knowledge reciprocity in the afloat community, whereas rank disparity and afloat culture may limit knowledge exchange.	
Categories:	
	<ul style="list-style-type: none"> • Altruism and the desire to help others motivates knowledge-sharing in the afloat community. • Rank influence may limit knowledge reciprocity, whereas interpersonal networks may increase knowledge reciprocity. • Afloat culture and fear of attribution may limit knowledge reciprocity.
Pattern Codes:	Informal; afloat culture; afloat career intentions; afloat vs. ashore experiences; altruism and helping others; afloat vs.

	ashore influences; reciprocate = not important; reciprocate = important; rank & seniority influences; unit size
Sample Survey Quotes:	“When I was more junior, I solicited more than I shared;” “I try to reciprocate as much as a possible. But it depends on whom I am interacting with and what is our relationship;” “There's absolutely no reason to withhold knowledge, helping out fellow a cutterman is also helping out myself;” “Not sure, cuttermen can be pretty egotistical. With that comes an attitude of "I won't/don't need any help" and possibly knowledge hoarding; since knowledge is power”
Sample Interview Quotes:	“You've done it. You might have lessons learned or best practices, so why not set someone up for success;” “Right, but I think as a senior, you don't expect a give / take, you expect a give. That's the whole point, training the people behind you. But when you're out there or if you're dealing with peers, it's always a give / take;” “In the afloat community ... there's occasionally a mentality where people... would rather have questions asked of them so that they can impart their knowledge, which typically comes with the personality type that implies that they are the holder of the knowledge and therefore don't need any”

Altruism

Expressed in a variety of ways by different afloat members, altruism was the most prevalent influence on communal knowledge reciprocity. One member explained:

I think you are missing the mark using the term reciprocate. Cutter folks share knowledge with each other so that we can make it through the day, season, tour, etc. Again, I don't share knowledge expecting that someone else will, in return, share knowledge with me.

This is a powerful statement regarding why individuals reciprocate knowledge within the afloat community. This individual describes an altruistic behavior whereby knowledge is shared to try and help others be successful. Use of the expression “make it through” also implied that this knowledge was integral to others’ success. The majority of study participants noted that the need to receive information back from others or to have a balance of information exchange was not important to them. Rather, the desire to assist other people motivated knowledge reciprocity. One member addressed her belief in altruistic knowledge-exchange in the following statement:

I feel like we hang our own young. People don't have that feedback or that advice so if someone junior, and sometimes, I've had a couple, some of my mentors have asked me questions too, that advice should be freely going. You've done it. You might have lessons learned or best practices, so why not set someone up for success.

This member addressed both altruism and cultural barriers to knowledge-sharing and cooperation within the afloat community. The expression “we hang out own young,” and similar derivations were applied by several members regarding reciprocity and communal trust, addressed in research question two. One member explained that he shared in order to save others from making the same mistakes he did. He explained:

It [reciprocity] did not influence me to share. My rationale behind that was if I had to go through the learning process and the growing pains of getting there by me sharing that, I could allow somebody else a little more time to do the actual job that we're supposed to be doing rather than going through the same process.

This members' statement also reflects a desire for efficiency and a belief in knowledge-sharing for the purpose of getting the job done correctly and expeditiously, rather than allowing another member to flounder and struggle with making mistakes. By reciprocating knowledge, members felt that they could contribute to process improvement and greater efficiency. One member described the benefit of reciprocity as allowing individuals to become "wise" and explained:

The best phrase I ever got was from one of my COs, who said, "A smart person learns from his own mistakes, while a wise person learns from another's mistakes," it's better to be wise than smart. I would argue that's been one of the things I've picked up on throughout my career, and it's what I tell others all the time...when I was at the sector and you're dealing with small boats, "Hey, learn from what other people have done, learn how maybe their decision making wasn't right, or where that error chain didn't break, and learn from their mistakes, so that you can hopefully not repeat that mistake, or in worst cases, at least learn from your own mistakes, so you don't do that again."

Knowledge reciprocity facilitated greater opportunity for learning and communal betterment and was seen as a mechanism for closing the loop on a particular exchange of information. By responding to others, members provided information critical to both individual and communal success. This altruistic approach to exchanging information was prevalent throughout this study and highlighted during member's responses to interview and survey questions regarding reciprocity. The desire to help others perpetuated knowledge exchange and was more influential than the desire for reciprocation, which was deemed unimportant to the majority of study participants.

Afloat vs. Ashore Influences

When asked how often they reciprocated knowledge with others and how often the afloat community reciprocated with them, afloat members responded with frequencies akin to those described when addressing overall knowledge-sharing. One member noted, “Once again the answer is almost 100% of the time. As long as there's knowledge to be shared, it's passed.” The terms “Always,” “Weekly,” and “constantly” were used to describe how often members reciprocate with others. Another member described the reciprocation of knowledge as intuitive and organic. He explained, “It is all part of the same conversation - we often ask each other how the other person handled a certain situation so we have it in our personal databank.” The distinction between afloat and ashore reciprocity was also made with members describing the reciprocation of knowledge as occurring more frequently while stationed afloat vs. ashore. One member described reciprocation as “rarely/not very often when not at an afloat unit. Regular basis when assigned to an afloat unit.” Other members responded to the question from the vantage point of an afloat member regardless of whether they were actually stationed afloat. One member explained reciprocity metaphorically, noting “From outside the lifelines, rarely. Inside the lifelines, knowledge sharing is continually reciprocal.” This statement implied that individuals don't typically reciprocate knowledge outside of their immediate professional network.

Rank and Network Influences

Although most members described frequent reciprocation of knowledge, particularly when stationed afloat, others described factors that limit their reciprocation. Specifically, the influence of rank and relationships were noted as limiting factors in

communal reciprocity.

Similar to its influence on the overall frequency of knowledge-sharing, seniority was considered an inhibitor to reciprocity by some members. One member explained:

I feel like I'm pretty senior so I feel like a lot of times junior people will be asking me my opinion or things, so I feel like I give a lot of knowledge and I don't get the same amount back.

Similarly, another member explained, "When I was more junior, I solicited more than I shared. After my second tour afloat, I would say it became more equal." These members noted that the relative lack of information or insight on a junior member's behalf may result in them soliciting more than reciprocating knowledge. Members did not seem to view this as a deterrent to knowledge-sharing, but a dynamic reality that shifts as individuals gain more experience. One senior member with 23 years of service summarized this influence by stating, "I just have to know that where I'm at in the rank structure of a military organization also impacts the amount of knowledge sharing." The influence of rank and seniority on reciprocity was rooted in the relative amount of knowledge possessed by juniors compared to seniors. This rank influence was regarded as influential, but not detrimental to reciprocity.

Personal relationships and networks were considered influential to knowledge reciprocity. When describing how and with whom he shared information, one member explained:

I will say, something we haven't hit so far, it's all currently, I believe, your own network base. It's nothing formal. I know cutter forces on LANT [Atlantic] side and PAC [Pacific] side assign mentors for every, at least, major command. I've heard great things about that. I've heard there's not much value added if you didn't have a previous relationship with that person.

This member expressed that existing relationships influenced the amount of knowledge that he reciprocated and were critical to having productive knowledge exchanges. Similarly, this member noted that reciprocity was important to him with his peer group, explaining, “I personally like the give and take...I'm not comfortable if there's no give back as part of adding value to...the experience.” Other members expressed similar sentiments regarding the importance of reciprocity in their decision to share knowledge. One member explained, “For me, so I think that reciprocation is important to show that somebody cares, and so there's a value to the input that you're providing up there.” Similarly, the need to see and demonstrate the value of knowledge-exchange fostered knowledge-reciprocity for some members. One individual stated:

You just get tired of providing, and never knowing. When someone wants to perfect their plan of the day, and they're looking for example plans of the day, it would be nice if you could also see what other people are doing without having to constantly go back and solicit each individual for that. If somebody's already collecting that information, it would be nice if there was a way to share it. So, therefore, I get tired of sharing because I'm never going to find anything else out.

This member's comment affirms the notion that a lack of reciprocity can limit communal knowledge-exchange, but does not reflect the majority of respondents' opinions regarding knowledge reciprocity in this study. Most members did not consider reciprocity an influence in their decision to reciprocate knowledge with others.

Operational Specialty and Cultural Influences

Similar to rank, one's operational specialty and associated culture were considered influential to knowledge-exchange. This influence was not as prevalent as rank, but several members drew distinctions between the manner in which the aviation and afloat community reciprocate knowledge. One member explained:

If you look at the aviation side, they have two different pieces to it, you know they have the safety, which is shared wide and far, and it's not going after someone. Then you have the administrative side. If there's an incident, there's the admin investigation and the safety investigation. Safety investigation, they share that a lot, you learn from those things. We don't necessarily do that so well on the afloat side.

This member felt that the aviation community's emphasis on safety prompted greater sharing between members. Since there is less of a fear of attribution when reviewing aviation safety concerns, members are able to be more open and exchange knowledge more freely. This opinion regarding greater sharing opportunity and reciprocity was echoed by several members. One individual stated, "The aviation community shares every single one of their mishap messages. Even if it's the most boring, non-relevant thing, they will share it. The afloat community never shares them." The distinction between afloat and aviation culture in terms of sharing knowledge and lessons learned was evident throughout the study. Members considered the relative openness of aviators to positively contribute to knowledge reciprocity, whereas a fear of attribution was considered predominant and detrimental to knowledge-sharing within the afloat community.

Summary for Research Question One

By exploring afloat member's willingness to share knowledge, including the frequency, forums, and influence of reciprocity, the researcher determined that afloat members share knowledge frequently with other members in a variety of different forums. Members' preferences for knowledge-sharing forums were heavily influenced by whether they were stationed ashore or afloat. Most members noted a significant increase in their communal knowledge-sharing while stationed afloat. The majority of afloat

members preferred informal virtual forums, including email and instant messenger, but this preference was influenced by age and generational affiliation. Phone calls and face-to-face exchanges of sea stories were also highly regarded forums for knowledge exchange. Afloat members acknowledged reciprocation of knowledge within the community but did not consider reciprocity influential to their decision to share knowledge. Rather, members' overall willingness to share knowledge was most heavily influenced by altruism and the desire to help others succeed within the confines of the highly competitive and attributional afloat community.

Research Question Two

Research question two addressed how members of the afloat community described their ability to trust other members with information regarding mistakes or lessons learned on the job. Data was collected through survey and interview questions outlined in Table 15 that addressed members' perceptions of their personal comfort level and the community's comfort level with sharing mistakes and lessons learned.

Table 15 **Research question two with supporting interview and survey questions**

Research Question	Survey Questions	Interview Questions
2. How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?	10. Describe your comfort level with sharing mistakes or lessons learned with other members of the afloat community.	4. Are you comfortable sharing mistakes and lessons learned with other members of the afloat community?

11. Describe how you perceive other afloat members' comfort levels with sharing mistakes or lessons learned within the afloat community.	5. Do you trust other members of the afloat community will respect knowledge shared regarding mistakes or lessons learned?
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Overall, members expressed some degree of personal comfort with sharing their own mistakes and lessons learned but considered the afloat community as a whole less comfortable with sharing these mistakes and lessons learned. The themes surrounding personal and communal comfort with sharing mistakes and lessons learned are outlined in Table 16.

Table 16 Themes and Supporting Categories from Research Question Two

Themes	Categories
Altruism, seniority, and close communal ties positively influenced members' perceptions of personal and communal trust with information regarding mistakes and lessons learned.	Altruistic influences surrounding safety and education positively influenced personal comfort with sharing mistakes and lessons learned.
Perceptions of communal trust vary throughout the afloat community	Smaller, tight-knit nature of afloat operational specialties enhanced trust and communication within afloat community.

Rank and relative seniority enhanced trust and willingness to share mistakes and lessons learned.

Comfort with sharing mistakes and lessons learned is diverse and personality driven.

Personal and communal trust with sharing mistakes and lessons learned is limited by the desire to preserve one's service reputation.

Perceptions of gender stereotypes may influence willingness to share information on mistakes and lessons learned.

Rank disparity, along with personality and gender distinctions, limits personal and communal trust with sharing information on mistakes and lessons learned.

Junior members may be less likely to share information regarding mistakes and lessons learned with senior members.

Perceptions of others' personality distinctions may limit comfort with sharing mistakes and lessons learned.

The desire to preserve one's service reputation may limit sharing information on mistakes and lessons learned.

Organizational and communal intolerance for mistakes limits comfort with sharing mistakes and lessons learned.

Members perceived an organizational and communal intolerance for mistakes that limits comfort with sharing mistakes and lessons learned.

The consequences associated with a particular mistake and the audience with whom it may be shared influenced members' sense of trust.

Members considered the small size of the USCG as a deterrent to sharing mistakes and lessons learned.

Members were less likely to share more severe mistakes and lessons learned.

Members were more comfortable sharing information on mistakes or lessons learned in person, where the audience was known.

The findings also revealed that members who were comfortable sharing mistakes and lessons learned valued learning opportunities afforded by communal knowledge exchange. Influences common to personal and communal discomfort with sharing mistakes and lessons learned included gender, rank, personality, and service reputation. Unique to communal discomfort with sharing mistakes was the influence of afloat cultural aversion to mistakes. Service size, topic influence, and communication forums were influences unique to personal discomfort with sharing mistakes and lessons learned. Findings revealed the afloat culture's intolerance for mistakes, judgment, and fiercely guarded service reputations may deter discourse on mistakes and limit communal trust.

Personal and Communal Comfort with Sharing Mistakes

When describing their personal comfort level with sharing mistakes and lessons learned, sixty percent of participants responded positively, describing themselves as "very comfortable," or "extremely comfortable." Members also described their personal comfort levels as "high" and one referred to herself as an "open book" with regard to sharing mistakes and lessons learned. By comparison, members' descriptions of communal comfort were less prevalent and affirmative. Less than ten percent of survey respondents described communal comfort with sharing mistakes and lessons learned on par with their own comfort levels. One survey respondent described a high level of comfort within a small group of peers:

For the most part, most afloat members that I associate with are very comfortable with relating their mistakes and lessons learned. However, I can think of a handful of colleagues and even senior officers that are often mute on their short-comings.

Another member described communal comfort as, “I think the same or similar to mine: OK to share as long as it wouldn't do long term damage to their professional reputation.” Ultimately, members’ descriptions of communal comfort were riddled with caveats and limitations. Members initiated their statements on communal comfort with expressions such as “In my circles,” “Depends on the guy/gal in the chair,” or “hit or miss.” Although these disclaimers may have reflected an individual’s reluctance to make a sweeping statement or inaccurate generalization, they affirmed that communal perceptions are less favorable than individual perceptions of comfort with sharing mistakes and lessons learned. The primary themes surrounding personal and communal comfort with sharing mistakes and lessons learned are outlined in Table 17.

Table 17 Themes with Supporting Categories and Data Detailing Personal and Communal Comfort with Sharing Mistakes and Lessons Learned in the Afloat Community

Research Question 2: How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?

Themes:

- Altruism, seniority, and close communal ties positively influenced members’ perceptions of personal and communal trust with information regarding mistakes and lessons learned.
- Perceptions of communal trust vary throughout the afloat community.

Categories:

- Altruistic influences surrounding safety and education positively influenced personal comfort with sharing mistakes and lessons learned.
- Smaller, tight-knit nature of afloat operational specialties enhanced trust and communication within afloat community.
- Rank and relative seniority enhanced trust and willingness to share mistakes and lessons learned.
- Comfort with sharing mistakes and lessons learned is diverse and personality driven.

Pattern Codes:	Altruism; for safety; learning; comfortable; comfort within specialty; retirement eligible;
Sample Survey Quotes:	<p>“I am happy to let others know what I did wrong. Save them from repeating the same mistake if I can”; “These days pretty high...I'm at the tail end of my career and realize that my best contribution is knowledge and lessons learned so that is a priority of my command philosophy; give back all that I have learned”; I try to be as transparent as possible; we are all on the same team there shouldn't be any secrets as to how/ why something went wrong”; “Depends on the guy/gal in the chair,” or “hit or miss”</p>
Sample Interview Quotes:	<p>“I totally share. I'm like don't do this. Yeah because it's also good for coasties in general, cuttermen in particular, but coasties in general to realize you can get to Lieutenant Commander and messed up a whole lot in your career”; “I always vowed this shall never happen to anybody junior to me again”; “So there is the community of practice, if you will, of engineers afloat. Because we have a tight network, we can sometimes integrate the things we shared into the response of the cutters, which actually accelerated our service”</p>

Altruism

Members who described altruistic influences in their comfort with sharing mistakes and lessons learned described the educational and safety value associated with these experiences. One member explained, “The best way to ensure proper risk associated with evolutions is to talk about the mistakes and lessons learned from those mistakes.” Similarly, another member described, “Sharing a mistake can help others avoid it. Especially, when it concerns safety. A little embarrassment is worth the passing of knowledge.” These members expressed strong value for safety and highlighted the potential benefit of sharing knowledge to reduce operational risk and prevent accidents.

Similar to safety, members who described the learning value associated with sharing lessons related it to communal betterment. One member explained, “I will share of those experiences because you learn through life's lessons and that was a big lesson for me as a young officer; how to interact with other afloat members.” This member considered her experience a valuable lesson that may benefit the greater community, particularly junior members. Some members described unique learning opportunities that stem from lessons learned, but noted that their willingness to share these mistakes is not reflective of the entire afloat community. One member explained:

I'm very comfortable sharing mistakes and lessons learned, and almost to a fault...those are some of the most valuable teaching moments that I found personally, and as a professional trainer and educator, I have a different perspective on mistakes, I think that some people pride themselves on perfection, I don't.

This member's statement alluded to a sense of vulnerability that may arise from sharing mistakes. Although this individual considered the learning value of these mistakes greater than any risk associated with sharing, he noted that other afloat members have higher

regard for perfection. The afloat community's regard for perfection was considered a deterrent to communal knowledge sharing and trust.

Operational Specialty, Rank, And Personality Influences

Although less prevalent than altruism, some members considered their operational specialties and relative seniority within the afloat community beneficial to knowledge-sharing and information exchange. One member described, "So there is the community of practice, if you will, of engineers afloat. Because we have a tight network, we can sometimes integrate the things we shared into the response of the cutters, which actually accelerated our service." This member's "close network" positively influenced knowledge-sharing and exchange within the greater afloat community. Similarly, members considered their relative seniority and retirement eligibility as beneficial to sharing mistakes. One member who was retirement-eligible explained:

No question is stupid, so I will ask the stupid questions for that knowledge sharing...Even if I'm in with senior leaders and they'll be like, "oh, that was a really stupid question," I'll still ask it because I'm not worried about...I don't have any career fear.

This lack of "career fear" enhanced several members' comfort levels with sharing mistakes and lessons learned, but also highlighted the vulnerability associated with expressing errors. Some individuals also felt that communal comfort level couldn't be qualified due to the diverse personalities within the afloat community. One member explained, "Depends on the personality type. I would break it into four categories – 'Better than you, I never made mistakes,' 'Happy to Teach/Help You,' 'Average JO [Junior Officer],' and 'Can't Wait for Land.'"

Personal and Communal Discomfort with Sharing Mistakes

There was significant overlap between factors influencing communal and personal discomfort with sharing mistakes and lessons learned. Figure 6 illustrates the pattern codes supporting personal discomfort on the right and communal discomfort on the left.

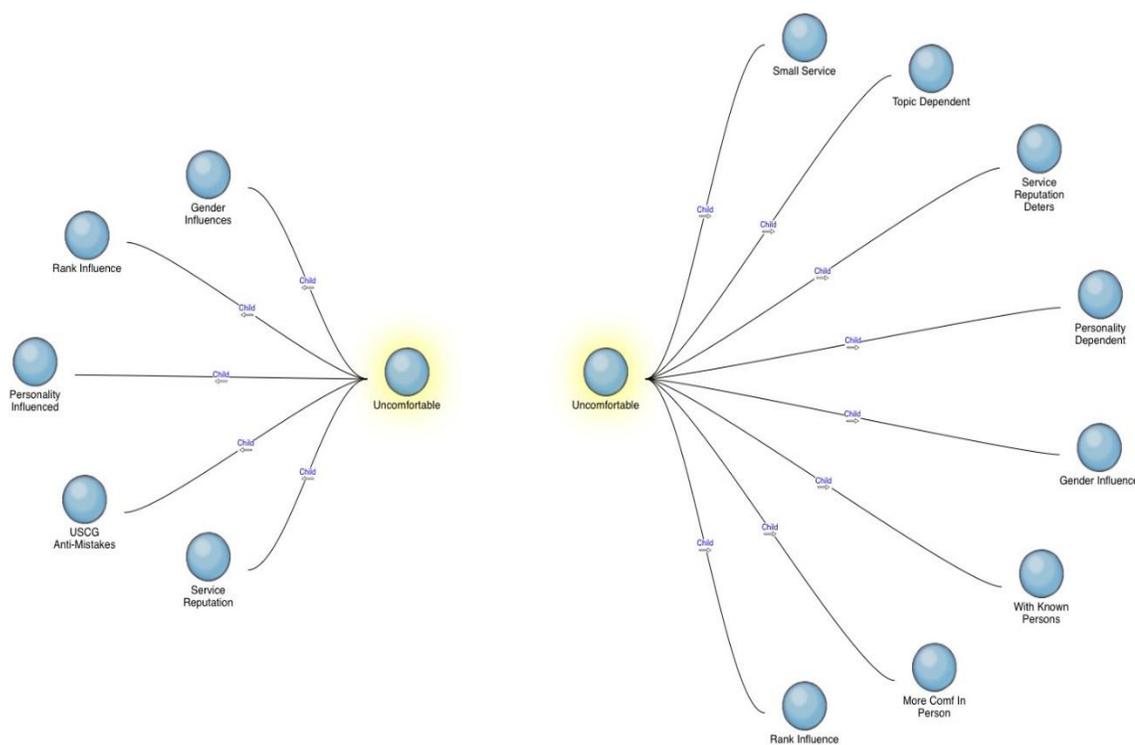


Figure 6. Comparing pattern codes supporting communal vs. personal discomfort with sharing mistakes and lessons learned.

The influences of gender, rank, personality, and service reputation were common to personal and communal discomfort with sharing mistakes and lessons learned. Themes and supporting data and codes are outlined in Table 18.

could potentially affect my professional reputation, I would be more reserved”

Sample Interview “There are many different flavors of afloat officers but there's an
Quotes: underlying macho-ism of something that exists”; “We're
probably less likely to share lessons learned when it's our own
failure, because we tend to guard our reputations, we're a little
worried”; “I would say they respect it, yes. I don't think they'd
be willing to share. I think that's a very prideful thing, and I'm
not trying to say I'm amazing;” “Going further up the chain, it
gets a little different because the overall community is more of a
top-down structure where information is supposed to flow from
top to bottom.”

Gender

Gender was explicitly described as a barrier to sharing mistakes and lessons learned but was limited to the statements of two female interviewees. The influence of gender was, therefore, not considered a major finding within this study, but was influential to personal and communal trust. One member explained:

Being a female cutterman, you are judged a little bit differently. There's that aspect of are they going to judge me as a cutterman, or are they going to somehow add in some sort of unintentional or intentional bias that I was a female counterman? So that's one part of it.

Although this member did not imply that gender prevented her from sharing, she referenced it as an additional consideration she had when putting information out to the community. Another member referenced gender stereotypes as potentially reducing the number of mistakes that men were willing to share with the afloat community. She explained:

I don't want to throw gender or anything out in there, but I think it's a very masculine trait that I can only be this one way. There are many different flavors of afloat officers but there's an underlying macho-ism or something that exists.

This member felt that the desire to conform to a “macho” stereotype contributed some degree of communal discomfort with sharing mistakes and lessons learned.

Rank

Rank disparity also challenged individual and communal sharing of mistakes and lessons learned. One member explained:

Junior people, with their careers still ahead of them, are hesitant to share the "I messed up and got away with it" stories, particularly with senior people who might be or talk to someone on a future selection board or assignment panel. There is safety in silence.

When comparing the influence of rank on comfort vs. discomfort with sharing mistakes and lessons learned, an interesting distinction was drawn. Senior members considered their time in service as a positive influence in knowledge-sharing whereas junior members considered their relative inexperience to be a deterrent to sharing information regarding mistakes and lessons learned. One third of interviewees, along with three survey respondents, referenced their job security or retirement eligibility when describing their willingness to share mistakes and lessons learned. A senior interviewee declared,

“There's no hesitation [with sharing information] because I'm at the part of the organization where they pretty much near have to fire me.”

Similarly, when asked about communal and individual comfort with mistakes and lessons learned, close variations of the following statement were made, “Typically, the comfort level is high with peers and low with those who are superior.”

Personality Distinctions

In addition to gender and rank, personality distinctions were considered influential in the decision to share mistakes or lessons learned. One member explained:

...over time you kind of look at different personality types...and those types of individuals, they're not people that will ever admit mistakes, even when they're standing in front of the flag officer because they've been relieved...And then you have the other ones, that are truly negatively impacted by the environment, like I should have known better, I should have done better. If I had to do it again, I would have done this...and if you had played that out in an exact replica scenario, bad things would have still happened, and so you know you have kind of a false attribution...So it really, I guess, all that to say, it depends. It really does.

This member noted that the decision to share mistakes is deeply rooted within one's personality. Some members' personalities prevent them from openly admitting error, whereas others are quick to assume and convey an inequitable amount of error. This statement also implied that the presence of individuals who will not admit mistakes may contribute to personal discomfort with sharing. Another member described how some members' personalities may reduce the utility and value of mistakes and lessons learned:

It really depends on how well connected the individual is with themselves. I have seen mistakes shared from the perspective of rationalization, meaning they provide all the reasons why they weren't at fault or how there was nothing that could have been done to prevent the issue...I find this less helpful.

The influence of personalities on the decision to share was considered a deterrent to honest and impactful information exchange.

Service Reputation

The last theme common to both personal and communal discomfort with sharing mistakes and lessons learned was the influence of service reputation. One member explained:

We're probably less likely to share lessons learned when it's our own failure, because we tend to guard our reputations, we're a little worried ... I doubt the CO of a major cutter than runs aground wants to talk to everyone about how they ran aground.

The influence of service reputation on sharing mistakes was counter to that of altruism. Members explained that communal and individual discomfort with sharing mistakes or lessons learned was related to service reputation vulnerability. The degree to which a particular piece of information could damage one's service reputation weighed heavily in the decision to exchange knowledge. One member noted, "Reputation is important though, so [I'm] less comfortable sharing across the community or in formal settings especially if there is personal fault involved (both myself or my command/crew)." Another member cited a threshold when discussing the influence of service reputation on knowledge exchange. The member stated, "It depends on how severe. I think lessons learned are easy to share when nothing terrible goes wrong, but if it could potentially affect my professional reputation, I would be more reserved." Similarly, another member explained, "If I was trying to do my job and did it wrong and the consequences were limited, then to save pain for other folks, I would gladly share that." Striking the right balance between sharing information and preserving one's service reputation was necessary for members to feel comfortable with expressing their mistakes. Member's

prioritization of service reputation and career viability was a deterrent to individual and communal sharing of mistakes and lessons learned.

Communal Discomfort with Sharing Mistakes

The influences of afloat and USCG organizational culture in research question two were unique to communal discomfort with sharing mistakes. This theme and its supporting codes and data are outlined in Table 19.

Table 19 Theme with Supporting Categories and Data Detailing Communal Discomfort with Sharing Mistakes and Lessons Learned

Research Question 2: How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?

Theme: Organizational and communal intolerance for mistakes limits comfort with sharing mistakes and lessons learned.

Categories:

- USCG, at large, possesses an organizational aversion to mistakes.
- Mistakes should be contained and not shared freely throughout the afloat community

Pattern Codes: USCG anti-mistakes; afloat cultural influences; zero tolerance for mistakes; keep in lifelines; bad at sharing; mishaps equal defensive

Sample Survey
Quotes: “I think there is a cultural undertone in the afloat community that we can't or shouldn't make mistakes;” “I do think the community as a whole is resistant to admit to mistakes. It is easy for CO's to feel isolated from one another and to not understand that most CO's go through very similar struggles as one another;”

Sample Interview “I think the entire Coast Guard would not concede they made a mistake”; People don't trust sharing their dirty laundry, if you will, with mistakes”; “Well, I generated a response one time on one of those email strings which is absolutely nothing but 100% truth, and fired it off, but it didn't necessarily align with what my CO wanted people to hear”

When describing communal discomfort with sharing mistakes and lessons learned, many members noted cultural intolerance for mistakes within the afloat community and the greater USCG. One member explained:

I have no problem doing this with close peers or folks I trust. I don't trust the organization won't hold it against me. I have had very few bosses that I trust when it comes to reporting bad things. It's a very much 'zero sum' culture. We have little margins for mistakes and it's stressful. We don't have a very accepting service when it comes to mistakes.

Members repeatedly expressed that neither the afloat community, nor the USCG, were tolerant of mistakes, which negatively influenced their willingness to share this information. One member described:

I think there is a cultural undertone in the afloat community that we can't or shouldn't make mistakes. I am pretty sure I wouldn't be the leader that I am today or be where I am in the afloat community if it wasn't for the mistakes I made. I definitely have a lot of peers that don't like to share their mistakes even if you already know about them. It can make things awkward if past situations come up or someone asks about them when you are in a group. It can be a little odd at times, but it is a highly competitive and limited community.

This member clearly acknowledged the importance of sharing and understanding mistakes and lessons learned within the afloat community but implied that this awareness

could not overcome communal intolerance for mistakes or some members' unwillingness to share them. Other members referred to the desire to withhold information about mistakes or lessons learned from individuals outside of their unit to preserve the unit's autonomy and reputation. One member explained:

I think a lot of units become their own self-contained situation, and there's that phrase to keep everything "within the lifelines," and then when we need to we'll reach out. That's pervasive throughout the entire community, it seems, so trying to share mistakes is a challenge.

The desire to keep information regarding mistakes and lessons learned "inside the lifelines" was repeatedly referenced. Members also referred to the afloat culture as having "zero tolerance" for mistakes and being excessively "prideful." One member described:

I think we have a more competitive or judgmental community. I say that not as necessarily meanness, but... We don't have the same culture the aviation community has in embracing mistakes and mishaps, and learning from them, and not holding people necessarily as accountable to them.

This comparison to the aviation community highlighted the perception of error intolerance in the afloat community, but members considered this intolerance prevalent throughout the USCG. One member stated, "I think the entire Coast Guard would not concede they made a mistake." Similarly, another member described, "We'll [USCG] mask it. We'll make it a general issue and not a personal issue, so we can talk about it and not have to worry about it." Both organizational and afloat cultural aversions towards mistakes deterred communal expression of error and lessons learned.

Personal Discomfort with Sharing Mistakes

Members' personal discomfort with sharing mistakes and lessons learned was influenced by the smaller size of the USCG, severity of mistake, and the type of forum for knowledge exchange. These themes and their supporting codes and data are outlined in Table 20.

Table 20 Themes with Supporting Categories and Data Detailing Personal Discomfort with Sharing Mistakes and Lessons Learned

Research Question 2: How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?

Theme: The consequences associated with a particular mistake and the audience with whom it may be shared influenced members' sense of trust.

Categories:

- Members considered the small size of the USCG as a deterrent to sharing mistakes and lessons learned.
- Members were less likely to share more severe mistakes and lessons learned.
- Members were more comfortable sharing information on mistakes or lessons learned in person, where the audience was known.

Pattern Codes: More comfortable in person; small service; topic dependent;
 lessons ok, mistakes, no; severity dependent; with known
 persons

Sample Survey "I have no problem doing this with close peers or folks I trust. I
 Quotes: don't trust the organization won't hold it against me"; "moderate
 - it depends on the issue. Leadership lessons learned are
 sometimes easier to discuss than operational mistakes"; "More
 apt to share mistakes based on more time passing since the
 incident occurred. Basically, I become more comfortable with

sharing it as more time passes. This can also be audience dependent, if someone seems open to receiving the info without judgment then I am more willing to share”

Sample Interview “And I sat on panels, and I shared it then and they were like,
Quotes: without using names, people can calculate what other people in
the Coast Guard that is, cause it's a small service”; “You might
share that with your friends, you might share that with your
peers on that near ships, but you've really got to post that far and
wide. I don't know that our culture is quite at that level to want
to do that yet”; “I suppose sharing, maybe not in a virtual forum,
or like the Share Point site where it will be there in perpetuity,
so one of those maybe face to face conversations could probably
share something like that”

Members referenced the USCG’s small population as a deterrent to sharing mistakes. The USCG is the smallest branch of the U.S. armed services and the afloat community is one of its smaller operational segments. Members were uncomfortable sharing their mistakes because they felt that they would be judged or that their careers would be negatively impacted by sharing this knowledge openly. One member described the potential impact of this familiarity and judgment on promotion boards, stating “And I sat on panels, and I shared it then and they were like, without using names, people can calculate what other people in the Coast Guard did, cause it's a small service.” This

familiarity is further intensified within the afloat community as a smaller operational segment of the USCG. One member explained:

The cutter community is small, and you know this. When something happens, what's the first thing that happens in the community? It's a wildfire, "Whoa, what happened on there? What cutter did this, or whose gun had that, or what was the mistake? Wow, they must have screwed something up." Or, "I heard from Johnny, who heard from Jane, who heard from Mary that this is what occurred." It's a little tough in that sense I think, and you always have to be careful because the initial information is always wrong, so how do you balance that with also protecting the people involved, and then ultimately getting the investigation done and getting it out.

This member vividly detailed the negative and unintended consequences of sharing mistakes. He explained that individuals concentrate on the scandal, gossip, or attributing blame to other members of the community. This is difficult to "balance," as this member noted, with sharing the information so that others can learn from it and contribute to communal discomfort with sharing mistakes.

Other members felt that they were less likely to share certain mistakes that were more severe or focused on a particular subject area. One member explained, "I think it depends what kind of mistakes and lessons we're learning. As long as it has to do with maintaining readiness...think I would be comfortable." Similarly, others noted that they were less comfortable sharing operational mistakes than mistakes involving leadership. Some members contended that they were far less comfortable discussing a mistake than a lesson learned. One member differentiated between mistakes and lessons learned by explaining, "I think they'll [afloat community] respect a lesson learned that you worked through and reached success on. I do not think they'll necessarily trust ... People don't trust sharing their dirty laundry, if you will, with mistakes." This member considered the community uncomfortable with sharing a mistake because it implies failure.

Other members considered the community uncomfortable sharing mistakes in forums that were not face-to-face. One member described, “maybe not in a virtual forum, or like the Share Point site where it will be there in perpetuity, so maybe in one of those face to face conversations you could probably share something like that.” This member was uncomfortable with the permanence and lack of control associated with sharing mistakes in virtual forums. Likewise, other members were uncomfortable sharing mistakes or lessons learned outside of their immediate personal network due to a fear of the unknown. One member explained:

You might share that [mistake] with your friends, you might share that [mistake] with your peers on other ships, but you've really got to post that far and wide. I don't know that our culture is quite at that level to want to do that yet.

This member referenced control and afloat cultural barriers that contribute to communal discomfort with sharing mistakes and lessons learned. Members believed that the afloat community was not prepared for the scrutiny and judgment that could arise from larger distribution of lessons learned and errors.

Summary for Research Question Two

By exploring individual and communal comfort levels with sharing mistakes and lessons learned, the researcher determined that trust was limited within the afloat community. Members who expressed comfort with sharing mistakes and lessons learned took an altruistic approach to knowledge-exchange, describing how sharing knowledge contributed to the greater good. In addition to altruism, education and learning were noted as positive influences in the desire to share mistakes and lessons learned. The major influences of personal and communal discomfort with sharing mistakes and lessons

learned included rank, service reputation, gender, and personality. Senior members expressed greater comfort with sharing mistakes and lessons due to confidence and career stability, whereas junior members expressed greater fear of attribution when sharing mistakes. Members also noted that the extent to which they would share mistakes was dictated largely by their desire to preserve their service reputation. Mistakes of greater severity were, therefore, less likely to be shared due to potential damage to their reputation.

Research Question Three

Research question three addressed afloat members' disposition towards virtual learning. Data was collected through survey and interview questions outlined in Table 21 that addressed members' experience, comfort, and interest with learning in a virtual environment and their perception of the afloat community's comfort with sharing knowledge virtually.

Table 21 Research Question Three with Supporting Interview and Survey Questions

Research Question	Survey Questions	Interview Questions
3. How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?	12. Describe your experience with sharing knowledge in a virtual forum (blog post, online classroom, etc.).	6. Describe your experience learning in a virtual forum. 7. Are you interested in sharing knowledge with other members of the afloat community in a virtual
	13. Describe your comfort level with sharing	

<p>knowledge in a virtual forum (blog post, online classroom, etc.).</p>	<p>forum (blog post, online classroom, etc.)?</p>
<p>14. Describe how you perceive the afloat community's comfort level with sharing knowledge in a virtual forum (blog post, online classroom, etc.).</p>	<p>8. Are you comfortable sharing mistakes or lessons learned in a virtual forum (blog post, online classroom, etc.)?</p> <p>a. Do you perceive that other members of the afloat community are</p>
<p>15. Describe your interest in sharing knowledge with other members of the afloat community in a virtual forum (blog post, online classroom, etc.).</p>	<p>comfortable sharing mistakes and lessons learned in a virtual forum?</p> <p>b. Would the option for anonymous knowledge-sharing make you more willing to share knowledge in a virtual</p>
<p>16. How would the option for anonymous knowledge-sharing influence your willingness to share</p>	<p>forum? Why/Why not?</p>

mistakes or lessons-learned

in a virtual forum?

The findings revealed that the majority of afloat members expressed some degree of experience, interest, and comfort with virtual learning in a formal classroom environment or informally via blog post or discussion forum. Additionally, members described their perceptions of anonymity and virtual challenges, including limited virtual access and feedback while afloat and the need for management. Major themes and supporting categories are documented in Table 22.

Table 22 Themes and Supporting Categories from Research Question Three

Themes	Categories
Afloat members consider interpersonal engagement critical to learning.	Members who preferred face-to face learning considered the experience more valuable, requiring greater effort on their behalf.
	Members appreciated the interpersonal engagement afforded by a face-to-face environment

The challenges and efficiencies of virtual learning are valuable to the afloat community.

Learning in a virtual environment is more challenging than face-to-face learning and requires greater self-discipline.

Learning in a virtual environment affords efficiencies and informality appreciated by the afloat community.

Infrastructure and management limitations challenge learning in a virtual environment

Limited access and feedback underway challenge learning in a virtual environment.

Management is necessary for learning in a virtual environment

The ability to help others learn in a well-managed, forum enhanced members' comfort with virtual knowledge-sharing.

Altruism positively contributed to members' comfort with sharing knowledge in a virtual forum.

Retirement eligibility made members more comfortable sharing knowledge virtually.

Members felt that a well-managed virtual forum with consistent participation and valuable exchange would enhance their comfort with sharing knowledge virtually.

The option for anonymity may increase some members' comfort with virtual knowledge-sharing and overcome concerns regarding digital footprint and rank disparity.

Disparities in rank and age may limit virtual knowledge-sharing.

Members felt retirement eligibility increased their willingness to share knowledge virtually.

Digital footprint concerns reduced members' comfort with sharing knowledge in a virtual forum.

Older members may be less comfortable with virtual knowledge-sharing than younger members.

Rank disparity may reduce members comfort with sharing knowledge virtually.

Members who were not comfortable sharing knowledge felt anonymity may promote their knowledge-sharing.

Effective management and facilitation of virtual infrastructure and information exchanged is important to afloat members.

Some members' interest in virtual sharing knowledge was topic dependent.

Effective management and facilitation were important to members interested in sharing knowledge virtually.

Virtual considerations, including infrastructure challenges and desirable virtual attributes, would have to be vetted and implemented for effective knowledge-sharing

Anonymity may encourage virtual knowledge-sharing for junior members, but may deter others who desire personal accountability.

Anonymity may help overcome the challenges to virtual knowledge-sharing posed by a poor command climate, small organization, and rank disparity.

The option for anonymity would have little influence on virtual knowledge-exchange within the afloat community

Anonymity may reduce personal accountability or prevent quality judgment or further discussion.

Anonymity could have a negligible influence on knowledge-sharing because the USCG is too small to prevent personal identification.

Anonymity should be optional and regulated if implemented

Experience with Virtual Knowledge-Sharing

With the exception of six members, all participants possessed experience with virtual knowledge sharing. The levels of experience varied widely, ranging from online degree programs to posting documents in a virtual repository as outlined in Table 23.

Table 23 Virtual Learning Experience as Described by Survey and Interview Participants

Survey Data	Interview Data
“online course”	“bachelor's degree from Columbia College, I spent the better part of the last three years going online”
“graduate work on blogs and posts”	“Half of my Master's degree is virtual”
“detachments, which require virtual meetings”	“math class where I went and we did online work for one of the days and then the other day we went in person”
“blogs, online classrooms, and wikis”	“one formal online course”
“Blackboard, D2L, SharePoint, CGPortal Unit sites”	“I'm familiar with using Blackboard”
	“member of various, you know whether it be a Facebook group or a kind of LinkedIn things”
“advanced degree online”	

“online message boards”	“Most of my learning, and that's because I'm dated, before we even had the computer systems, so it's been a lot of that
“prepared for professional certifications in a virtual forum	face to face” “Mandated training”
“share knowledge via email chain”	

One member described his experience level as, “Significant experience with sharing knowledge in a virtual environment. I have taken many college level classes online, as well as reviewed and prepared for professional certifications in a virtual forum.” The majority of formal education that members described was graduate school and online coursework. By contrast, other members described significantly less experience with virtual knowledge-sharing. One survey respondent explained, “I've shared in posts or group emails. Never really did the other stuff.” Members also noted a lack of virtual learning options for the afloat community. One member commented, “There is not a forum open to this right now that I can think of within the CG.” Other members described available virtual learning forums for afloat members as “very limited.”

Preference for Face-to-Face Knowledge Exchange

In addition to describing their overall experiences, members described their preferences for face-to-face vs. virtual learning as documented in Table 24.

Table 24 Themes with Supporting Categories and Data Detailing Members' Preferences for Face-to-face Learning

Research Question 3: How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Theme: Afloat members consider interpersonal engagement critical to learning.

Categories:

- Members who preferred face-to face learning considered the experience more valuable, requiring greater effort on their behalf.
- Members appreciated the interpersonal engagement afforded by a face-to-face environment.

Pattern Codes: Brick and mortar preferred; need face time; negative experience; online less effort; online less valuable

Sample Survey
Quotes: "I have participated in some blogs through work but didn't find a lot of value. It seems to be more like 'rants' with uneducated positions"; "Would rather see the audience, and gauge their interest/reaction"; "The challenge with these sites is that they can be a burden since they are often buried within the CG Portal or other vehicle and take time away from other work"

Sample Interview
Quotes: "Learning wise I don't do well in a virtual form. I'm one-on-one, in person. So any online experiences to me is educational, but it's not professionally developing for me"; "I could see some limitations with online learning, but I also feel like online learning it's really hard to judge the effort given by the other parties, right? Obviously education is a lot you get out of it what

you put into it, but you also depend on other people and sometimes I've had instructors who weren't that good at using the online tools and thus it was a challenge that way"; "'Let's exchange leadership things,' and stuff like that. I think that's a very classic example of some of it, super good and super positive, but it's also sometimes overly sanitized. If somebody provides any sort of constructive criticism, it's like this total beat down on somebody providing an alternative viewpoint and saying like, 'Well, maybe you shouldn't have done that,' 'right?'; "I just don't connect with it"; "I think that's where it led me to, I was like, God, I wish I got more out of that, when we were in the classroom discussion face to face, than I did through the blackboard"

Members were not specifically asked about these preferences within the open-ended survey, but two members briefly referenced their aversion to virtual learning. One survey respondent related his virtual preference to experience, explaining "I have minimal experience with it, really for 2 reasons. 1. I don't necessarily enjoy/prefer that form of communication. 2. I haven't encountered a quality version of it WRT CG operations." Another survey respondent stated, "I have experience doing graduate work on blogs and posts. I have participated in some blogs through work but didn't find a lot of value. It seems to be more like 'rants' with uneducated positions." Members that preferred face-to-face forums considered online learning to be less valuable and less

challenging. The majority of data surrounding preferences for virtual learning was derived from interviews. One interviewee explained:

I could see some limitations with online learning, but I also feel like online learning it's really hard to judge the effort given by the other parties, right? Obviously, education is a lot you get out of it what you put into it, but you also depend on other people and sometimes I've had instructors who weren't that good at using the online tools and it was a challenge that way.

This member perceived a lack of effort by both instructors and students within the virtual forum. Similarly, other members noted that they derived less value from online forums.

One member explained, "But I feel like online you check a whole bunch of boxes and you walk away at the end of the day with an 'A' but I don't know how much I really retained." Those members that expressed preferences for face-to-face learning described a desire for interpersonal exchange and spontaneous conversations. When asked whether she preferred face-to-face learning, one member described her experience in a blended learning environment:

Yes. I do. I think it's because I couldn't see their facial expressions [virtually]...Now, when you write it in an email, or you do it in that Blackboard setting, nobody understood, the comprehension was not there and it was not as clear as in the classroom that night. When we'd come in on Monday evening, they would go, "I read your posting last night and I totally disagree with that."

In addition to the lack of physical interaction, other members felt that virtual engagement was forced and unnatural. One member explained, "Some of it [virtual knowledge-exchange], super good and super positive, but it's also sometimes overly sanitized. If somebody provides any sort of constructive criticism, it's like this total beat down on somebody providing an alternative viewpoint." Natural and spontaneous

interaction was highly regarded by the afloat community and virtual knowledge-exchange was considered incompatible to this approach by some members.

Preferences for Virtual Knowledge-Exchange

Two interviewees described a clear preference for virtual learning vs. face-to-face learning. Both survey and interviewees, however, described benefits associated with learning in a virtual environment. These members positively described the challenges, self-discipline, informality and efficiencies associated with virtual knowledge-exchange as outlined in Table 25.

Table 25 Theme with Supporting Categories and Data Detailing Afloat Members' Preferences for Virtual Learning

Research Question 3: How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?	
<hr/>	
Theme: The challenges and efficiencies of virtual learning are valuable to the afloat community.	
Categories:	
<ul style="list-style-type: none"> • Learning in a virtual environment is more challenging than face-to-face learning and requires greater self-discipline. • -Learning in a virtual environment affords efficiencies and informality appreciated by the afloat community. 	
Pattern Codes:	Positive experience; online evolved; online more valuable; online saves time; greater accountability
Sample Survey	“I have one year of sharing in an online classroom...it is great,
Quotes:	but that environment provided a very specific structure for sharing that supported something that I call guided discovery”;
	“Don't have time for blogs believe they are prohibited by USCG

internet/computer access policy. I did recently take an online classroom course with HSI (their course on derivative classification) and I was impressed by the combination of having a screen and digital data on my own desktop while a live teacher gave the course to a number of us over a conference call. Efficient and effective”; “In the SEAK PB community we had great success with collecting lessons learned about operations and voyage planning and then transmitting those across our peer group using a webmap that tied to a local flatfile database. We couldn't use the normal CG collaboration tools (CGPortal) because they required web access. This was particularly helpful for visiting ships”

Sample Interview “I felt like I was challenged more personally;” “And really, you weren't attending class online. You were putting yourself through classes. You were learning the material, doing these really difficult assignments that made sure you did the work, that you read the book ... They had targeted curriculum development, and it was a very robust curriculum to make sure you were actually using the materials they sent you and you were studying the things they wanted. And you had to send those in on a schedule;” “It's a lot less time consuming than going and listening to somebody and having them ask, in a formal setting”

These members described the virtual learning experience as “more challenging” with greater opportunity for reflection and autonomy. One member who completed his Master’s degree entirely online explained:

I think what I liked about that experience... You had the opportunity to do research on that problem set and then you had the ability to do what I called thoughtful hand raising. When you're in a classroom setting, and the professor or the instructor poses a question or a problem set...there's this propensity for pop-off answers. You have the increased propensity for the person who in their own mind, measures success by the amount that they can talk, and that air space that they can fill up, regardless of whether there's value to it or not.

This member considered the opportunity for personal reflection and preparation desirable and valuable to the learning experience. This value proposition also contradicted that of members who preferred the spontaneity of face-to-face learning. Other members considered the online learning environment more challenging because “you had to be more self-disciplined.” One member explained, “And really, you weren't attending class online. You were putting yourself through classes. You were learning the material, doing these really difficult assignments that made sure you did the work, that you read the book.” This members’ statement captured the prevailing opinion of members who preferred virtual knowledge-exchange because it required greater self-discipline and effort than resident instruction. Additional benefits of virtual learning that members noted were time management and informality. One member explained:

It's a lot less time consuming than going and listening to somebody and having them ask, in a formal setting. While I like that, I don't have a lot of time in the world and the job description to do that. In the float community, it's time intensive there.

This member considered the benefits of virtual knowledge-sharing well-suited to the rigors of the afloat community. Specifically, the ability to save time and operate in a less formal environment was desirable to afloat members with dynamic and challenging

operational schedules. Members also considered informal virtual exchange beneficial. One member explained, “To me that's [knowledge-sharing] all happened on an informal basis, through email and text messages and stuff like that. I find that an easier environment to work in and to learn in.” Members also described themselves as being more open to sharing information in an informal virtual environment.

Challenges of Learning in a Virtual Environment

Regardless of their experience or preference for virtual knowledge-sharing, challenges and limitations of this forum emerged as a major theme. As demonstrated in Figure 7, the primary challenges that members associated with virtual knowledge-sharing included limited virtual infrastructure within the USCG, limited underway access and feedback, and the need for management. These themes and their supporting data are described in Table 26.

Table 26 Themes with Supporting Categories and Data Detailing Afloat Members' Perceptions of the Challenges of Learning in a Virtual Environment

Research Question 3: How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Theme: Infrastructure and management limitations challenge learning in a virtual environment.

Categories:

- Limited access and feedback underway challenge learning in a virtual environment.
- Management is necessary for learning in a virtual environment.

Pattern Codes: Limited access underway; limited feedback online; needs management; needs etiquette; needs facilitation; USCG behind the times

Sample Survey
Quotes: “Very limited. Only taken one online course. It can work with the right environment, but also needs connectivity”; “I have one year of sharing in an online classroom...it is great, but that environment provided a very specific structure for sharing that supported something that I call guided discovery”;

“Comfortable sharing in the blog or group email. The other stuff, I couldn't say. I'm on a boat. Boat gets underway. No connectivity”; “There would be growing pains, change resistance, but it would get there - as long as there is a real need for it, some buy-in for stake-holders/organization, and a system of care for said forum”

Sample Interview
Quotes:

“I didn't feel that it added value to me. My preferences for in residency or in person learning and sharing, but I think that a lot of that comes from lack of proper ... What's the word? Proctoring, or management of it. Does that make sense?”; “A virtual environment that's not structured in a meaningful way is just, is not as useful as one that's structured in a meaningful way. And meaning is in the eye of the beholder”; It was harder afloat in some regards, because access to the internet was more limited, but I'll tell you one thing that is often overlooked is access to a workstation”; “Things that I laugh about now, general rules about what you should and shouldn't do on the internet, we had to keep reminding people. "Hey, people are watching you." Which is hilarious”

The prevailing sentiment regarding the USCG's virtual infrastructure was that it was not as capable as other public and private sector organizations. This perception was

noted when members described experience, interest, and comfort level with sharing information virtually. One member explained:

We [USCG] are never going to get better if we don't become a more mobile, modernized IT [Information Technology] infrastructure for the organization. We've got kids that are learning with binders of paper. You go to boot camp, you should be issued a tablet. I don't care what kind it is, you should be issued a tablet that you can drop it and it's not going to break, and it's got all your lesson plans on there, and you can take notes on there, because that's what the kids do.

Members also compared their experiences with virtual knowledge-sharing outside of the USCG when describing IT limitations. One member explained, "We are so behind in how we share information, how we train people, how we get that out there. If I go home right now, I can tele-work faster than my computer here works." Afloat members were also concerned that ships' IT infrastructures were not capable of supporting virtual knowledge-sharing. One member explained:

Getting the internet underway, you could just forget about that too, so you know. Now you have a bad portal site, barely can get on, why bother? You just stay in your own microcosm and keep yourselves happy, right?

Members described issues with both internet connectivity and access to a workstation underway. They also expressed significant frustration and incredulity with the prospect of virtual knowledge-sharing while at sea. The sentiment was particularly impactful because it reflected an organizational belief that transcended the boundaries of the afloat environment. Ultimately, members felt challenged by a lack of underway connectivity that was compounded by service-wide IT limitations experienced in port.

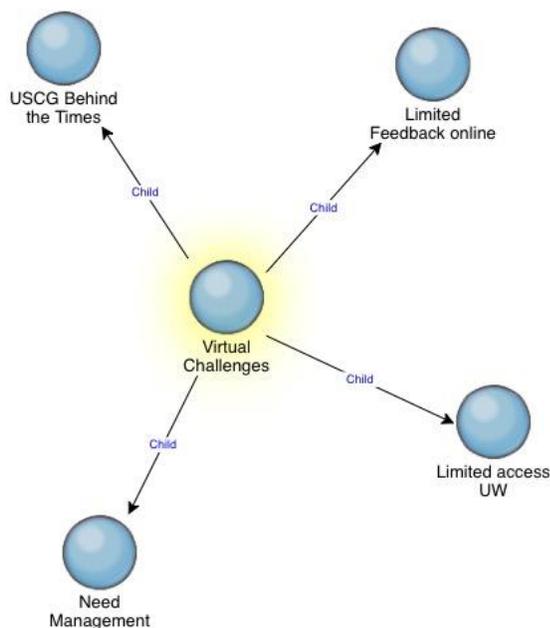


Figure 7. Factors influencing virtual challenges.

On a smaller scale, members expressed frustration with the opportunities for feedback while sharing knowledge-virtually. This opinion was limited to those who preferred face-to-face learning, but was referenced as a barrier to virtual knowledge-exchange. When describing the frequency and opportunity for providing feedback in a virtual environment, one member explained, “Closing the loop. I’m lost in that loop and then my give-a-care factor after probably 24 hours is oh, whatever, maybe somebody learned out of it.” This member felt that reduced feedback may limit the value of this forum and the likelihood of knowledge-sharing continuance. Participation was also considered necessary for members to engage in virtual knowledge-sharing in a purposeful, meaningful way. One member explained, “I would be interested if I saw there was value and that there was participation. I wouldn’t call myself a leading adopter of technology.” Participation and feedback were both linked to establishing and maintaining communal value.

The need for management and facilitation within a virtual knowledge-sharing forum was consistently emphasized. One member explained:

I want some formality to it. I want control, I want ... Even if it's just sharing on a portal page, I want somebody in charge of culling through, and getting rid of old information, and ensuring the information's up to date. I think it needs that human input. If you don't have that, it just becomes a dumping ground, or a waste of time.

This member referenced management from the perspective of administration and the need for someone to maintain overall functionality, accessibility, and organization of the forum. Another member advocated, "I would think it needs to be in a positive, moderated, facilitated, known environment in order to be something that juniors and seniors would want to participate in." Facilitation and moderation were used interchangeably when describing the human management aspect of a virtual forum. A moderator would provide the administrative function described above and verify that members engaged in accordance with a set of guidelines or virtual etiquette. One member described the need for a moderator to act as, "the center of effort that each person is comfortable with, making that, at least establishing that relationship. It's got to be a relationship. It can't be a faceless, nameless blog, post, group that's online." This member considered relationships an essential aspect of knowledge-sharing and one that could be challenged in a virtual environment.

Comfort with Virtual Knowledge-Sharing

Seventy-one percent of participants expressed comfort with virtual knowledge-sharing, including sixty-seven percent of survey respondents and eighty-three percent of interviewees. Participants who expressed comfort with virtual knowledge-sharing noted altruism, value, participation, and management as major influences in their willingness to

share knowledge virtually. To a lesser extent, retirement eligibility was also referenced as a positive influence in the decision to share knowledge virtually. By contrast, digital footprint concerns, rank and generational issues, and the desire for anonymity were expressed in relation to members' discomfort with sharing knowledge virtually. Themes supporting members' comfort and discomfort with sharing in a virtual forum, are compared in Table 27.

Table 27 Themes, supporting categories, and data detailing afloat members' comfort levels with learning in a virtual environment

Research Question 3: How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Themes:

- The ability to help others learn in a well-managed, forum enhanced members' comfort with virtual knowledge-sharing.
- Retirement eligibility made members more comfortable sharing knowledge virtually.
- The option for anonymity may increase some members' comfort with virtual knowledge-sharing and overcome concerns regarding digital footprint and rank disparity.
- Disparities in rank and age may limit virtual knowledge-sharing

Categories:

- Altruism positively contributed to members' comfort with sharing knowledge in a virtual forum.
- Members felt that a well-managed virtual forum with consistent participation and valuable exchange would enhance their comfort with sharing knowledge virtually.
- Members felt retirement eligibility increased their willingness to share knowledge virtually.
- Digital footprint concerns reduced members' comfort with sharing knowledge in a virtual forum.
- Older members may be less comfortable with virtual knowledge-sharing than younger members.
- Rank disparity may reduce members comfort with sharing knowledge virtually.
- Members who were not comfortable sharing knowledge felt anonymity may promote their knowledge-sharing.

Pattern Codes:	<p>No communal difference; altruism; diversity benefits; couch as lessons learned; uncomfortable; rank dependent; topic dependent; fear of criticism; need rules; etiquette; participation; personality dependent; too small a community; generational issues; digital footprint; afloat culture equals zero mistakes; virtual challenges; limited access underway; need management; limited feedback; USCG behind the times; be familiar with tools; push vs. pull; anonymity; connectivity issues</p>
Sample Survey Quotes:	<p>“Again, the reason I would share the information is for the lessons learned for the educational aspect of it”; “and a system of care for said forum”; I’m reasonably comfortable - however given the potential subject matter, I would like the cutterman virtual forum to be a moderated/member only type group”; “I’d be very comfortable if I perceived that I could add value and actually help people.” “Would rather see the audience, and gauge their interest/reaction. Problem with a blog is it is difficult to adjust to non-verbal cues...Maybe younger people could do this better than an old (started afloat pre-GPS) guy like me”; “I do not know if I would feel comfortable sharing in an open forum within the CG. Maybe if there was anonymity options”; “In a virtual form, some level of anonymity would likely be needed for all members to be willing to openly share. Or</p>

audiences may need to be separated by position and potentially rank. Lastly, people would need to be incentivized to use the forum (i.e., a valid reason to use)”

Sample Interview
 Quotes: “I would be interested if I saw there was value and that there was participation. I wouldn't call myself a leading adopter of technology”; “I got a retirement letter in now, but that's I think a hard thing to say, if it wasn't necessarily anonymous. I think people like the anonymous for things like that just because they are ... There will always be one, and that's maybe my bias”; “Right, and more experienced. I'm not sure I'd be in the same position as I was as a lieutenant on a patrol boat, how comfortable I'd be”; “I've shared stuff, whether it be a Facebook group or some other larger group where I don't necessarily end up putting a lot of myself out there online, because I'm kind of concerned about what that kind of feed loop, or you put something out on the internet and it's there forever”; “I think the generation that's underway right now is not as forgiving or as understanding with the capabilities”

Regardless of their level of comfort, survey and interview respondents presented their opinions on what features an effective virtual forum should possess, including employment of familiar tools, connectivity capability, and a push vs. pull of information.

Comfortable with Virtual Knowledge Exchange

Seventy-one percent of participants, including sixty-seven percent of survey respondents and eighty-three percent of interviewees, were comfortable with sharing knowledge virtually. Members who were comfortable sharing knowledge in a virtual forum noted similar desires for the function and purpose of their engagement, including altruism and their ability to add value to the forum. Additionally, consistent participation, effective management, and retirement eligibility enhanced members' comfort with sharing knowledge virtually. One member explained, "I don't think that you would have to find someone that's really open-minded to be like, 'Yeah, I'll give this a whirl, I'll put my name to it, I'll post on it so that others may learn.'" This individual considered altruism to be the guiding principle for virtual knowledge-sharing widely held throughout the afloat community. Similarly, another member noted, "the reason I would share the information is for the lessons learned...for the educational aspect of it." This member's comment highlights the connection between virtual comfort and value. Members were comfortable sharing knowledge when they considered the contribution valuable.

Similar to the factors influencing virtual challenges, members cited participation and effective management as necessary for them to feel comfortable. One member referred to administrative control and facilitation as a "system of care" for the virtual community. Regarding comfort and participation, another member explained, "I do think people are comfortable sharing knowledge online. The hardest part is getting consistent participation." Participation was considered a challenge and a necessity for comfort with the virtual exchange. To a lesser degree, members also referenced retirement eligibility as an influence in virtual knowledge-exchange. Similar to its influence in sharing mistakes

and lessons learned throughout the afloat community, seniority and retirement eligibility made members more comfortable with sharing information virtually. Regarding comfort level, one member explained, “These days pretty high...I'm at the tail end of my career and realize that my best contribution is knowledge and lessons learned so that is a priority of my command philosophy; give back all that I have learned.” This member’s statement also revealed an altruistic desire to impart knowledge for communal benefit.

Uncomfortable with Virtual Knowledge Exchange

Twenty-nine percent of participants were not comfortable sharing knowledge virtually. These members expressed digital footprint concerns, rank and generational influences, and the desire for anonymity. These themes and their supporting data and codes are outlined in Table 27. When discussing virtual knowledge-sharing, members consistently alluded to concerns regarding a digital footprint in which their contributions became permanent records. One member explained:

I've shared stuff, whether it be a Facebook group or some other larger group where I don't necessarily end up putting a lot of myself out there online, because I'm kind of concerned about what that kind of feed loop, or you put something out on the internet and it's there forever. I tend to be more of an observer and a watcher of those groups and an intake than a creator of content on some of those larger groups.

Members weren't comfortable with their information becoming permanently available with little control over its distribution and use. One interviewee referred this discomfort as a “fear of the unknown” and another interviewee referenced “social media and the black hole” when discussing uncertainty regarding the virtual exchange.

Concerns regarding rank disparity within a virtual forum negatively impacted members' comfort levels. One member explained, “I'm not sure how comfortable I'd be

with sharing my mistakes as a JO [Junior Officer] knowing there could be senior people out there that I'm going to work for one day.” This statement also revealed lingering concerns about how admitting mistakes may negatively impact one’s service reputation, particularly when senior members are privy to this information. Generational inclinations were also referenced when describing comfort with virtual knowledge-sharing. Members believed that more senior individuals may be less technologically inclined or willing to post information. Thirty-two percent of participants with over fifteen years of service expressed a lack of comfort with virtual learning. One member with over twenty years of service explained:

If you can't watch it on your phone, you're probably not going to get anywhere with some of the younger generation. Then some of the older generation, they need it printed out and bound, and they need to be able to write on it, take notes, and highlight it, but how do you do that? We have to morph to that way.

This member considered virtual knowledge-sharing essential to the younger generation, but acknowledged challenges with getting older members to embrace technology. When describing his willingness to share information virtually, another member with less than ten years of service described himself as sharing “Just fine, ‘Generation Text.’”

Two survey respondents who were not comfortable sharing knowledge in a virtual forum expressed the desire for anonymity. Anonymous knowledge-sharing was expressed as a method to increase members’ comfort with sharing mistakes and lessons learned.

One survey respondent stated:

In a virtual form, some level of anonymity would likely be needed for all members to be willing to openly share. Or audiences may need to be separated by position and potentially rank. Lastly, people would need to be incentivized to use the forum (i.e., a valid reason to use.

This statement also referenced the influence of rank disparity on members' willingness to share, which was a major theme within this case study. This member's reference to being "incentivized," however, was not present in other survey or interview responses.

Regarding anonymity, another member stated, "I do not know if I would feel comfortable sharing in an open forum within the CG. Maybe if there was anonymity options." It's important to note that the survey question to which both members were responding did not reference anonymity. Rather, as outlined in Table 19, the question only asked about members' comfort with sharing knowledge in a virtual forum. These members' both considered anonymity as a mechanism for increasing personal and communal comfort with sharing knowledge in a virtual forum.

Features of an Effective Virtual Medium

Regardless of their comfort level with sharing knowledge virtually, most members delineated the features of a virtual forum that they considered critical to its success and sustainability. Members' recommendations for an effective virtual forum are displayed in Figure 8.

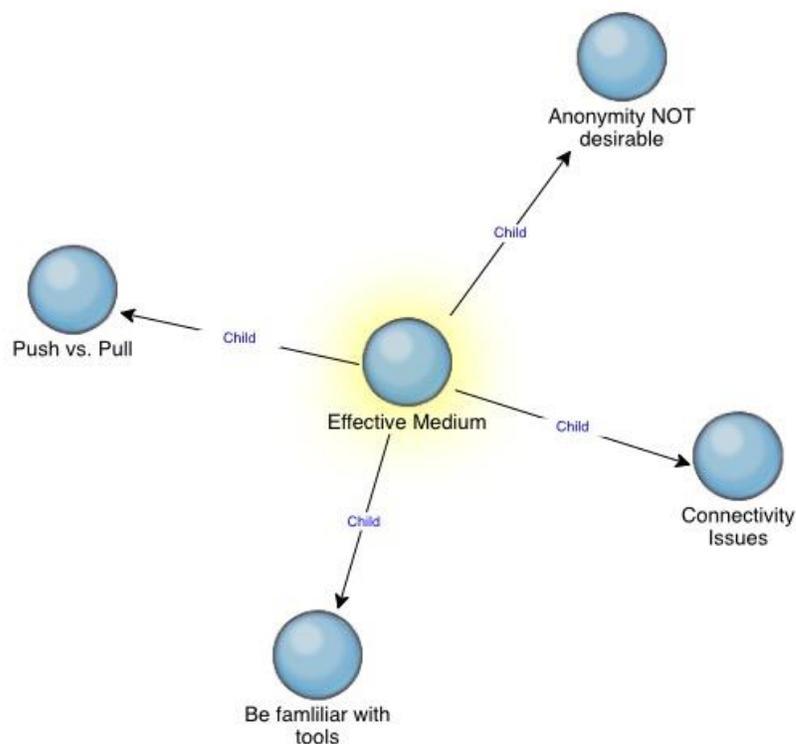


Figure 8. Attributes supporting an effective virtual knowledge-sharing forum.

Members' desired familiar tools that are compatible with the USCG's IT infrastructure. One interviewee explained, "you have to be familiar with the strengths and weaknesses of the technology you're using." Members felt that these tools should be accessible and functional while members are in port and underway. One member explained, "When you're afloat you typically don't have a lot of time, and the connectivity can be a big challenge, so if a forum is easy to use, and organized in an understandable manner, I think I would use it." Members emphasized connectivity and the capability to work offline if experiencing technical issues while underway and then access and download their contributions later. One member explained that he'd be very comfortable sharing information in a virtual forum "as long as it can be downloaded locally for underway access." To improve access and awareness of available information

and tools, members also recommended that the forum feed information to members as opposed to members having to search and pull the information. One member explained:

If it's a push, even if you have a central repository and you send an email to all the cutter COs [Commanding Officers] and XO's [Executive Officers] that says, "Hey, just posted a new investigation, here's a couple bullets on what it was." Great, now you can go in and get it, but if you're going to expect me ... It's kind of like the message board, we've got the message board where if I can remember to do it, I'll go in and look...but if you were to pop me something and say, "Here's the new messages for the day," great, it's got to be push versus pull.

This statement not only addresses the desire for a “push vs. pull” construct, but also advocates for the use of known tools such as email and a data repository.

Interest in Virtual Knowledge-Sharing

With the exception of seven survey respondents, afloat members in this case study affirmed their interest in sharing knowledge within a virtual forum. In addition to factors influencing members' interest and lack of interest in virtual sharing, major themes included topic dependencies, management concerns, and virtual infrastructure. These themes and their supporting data and codes are outlined in Table 28.

Table 28 Themes with Supporting Categories and Data Detailing Afloat Members' Perceptions of the Challenges of Learning in a Virtual Environment

Research Question 3: How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Theme: Effective management and facilitation of virtual infrastructure and information is important to afloat members.

- Categories:
 - Some members' interest in virtual sharing knowledge was topic dependent.
 - Effective management and facilitation were important to members interested in sharing knowledge virtually.
 - Virtual considerations, including infrastructure challenges and desirable forums, would have to be vetted and implemented for effective knowledge-sharing.
-

Pattern Codes:	Membership management; needs facilitation; needs participation; needs structure; to protect service member; voluntary and not mandatory; if value added; no sensitive personnel issues; no sensitive security issues; use phone for sensitive pers.; connectivity issues; cultural acceptance; need virtual exchange; no tools yet; desirable attributes; need conveniences; repository of info; need evidence-based tools; use known tools; digital footprint concerns
Sample Survey Quotes:	“high - as long as it can be downloaded locally for underway access”; “I would do it especially if it was an application/smartphone based discussion, i.e. easy to access”; “I would participate but probably not lead the efforts to organize. If there were an established medium to use and some sort of policing of content, I would be interested;” “Would prefer to see the CG Portal pages organized and better managed for knowledge sharing. That's how I think it would be best served. Right now, it's too haphazard and not maintained”
Sample Interview Quotes:	“I think so. Yeah there's several other things that come into play there. When you're afloat you typically don't have a lot of time, and the connectivity can be a big challenge, so if a forum is easy to use, and organized in an understandable manner, I think I

would use it”; “All these things come into play when you're afloat, and the priorities get shifted. I think we would have to make virtual communications more culturally popular in the Coast Guard for that to start to bleed into the operations afloat community more as like an expectation”; “And so what I think is a lot of those are, when I think of virtual sharing in a virtual environment or virtual community practice, I really think of a knowledge management repository. And it's a place where you can go and say, I need to know about what kind of issues people have had with their motorcycle breaks or what kind of issues people have had with a specific class of motorcycle or something like that. And then, I can go in there and search down to something that's specific to me, whether it's attributed to somebody or not is irrelevant at that point in time”; “You know, just my day to day I don't have a lot of social media footprint and I don't really post a lot online, so I think it would have to be really valuable to me to feel there was an investment to be made there, right?”

When describing their interest in virtual knowledge-sharing, members made recommendations and noted conditions of involvement, whereby they would only participate if certain managerial or infrastructure supports were present in the forum.

These conditions contributed to the study's major findings and will be included in recommendations for communal development and sustainment.

Interested in Sharing Knowledge Within a Virtual Forum

With the exception of seven survey respondents, eighty-six percent of afloat members in this case study affirmed their interest in sharing knowledge within a virtual forum. Themes surrounding members' interest in virtual knowledge-sharing included already sharing, great potential, meet info demand signal, and rank and viability influences. Afloat members who were interested in sharing knowledge within a virtual forum valued the opportunity to meet the demand signal for specialized operational expertise. Additionally, interested members felt that they were already sharing knowledge in a virtual forum, but that there was not enough of this knowledge exchange, expressed by the theme "too little sharing" illustrated in Figure 10.

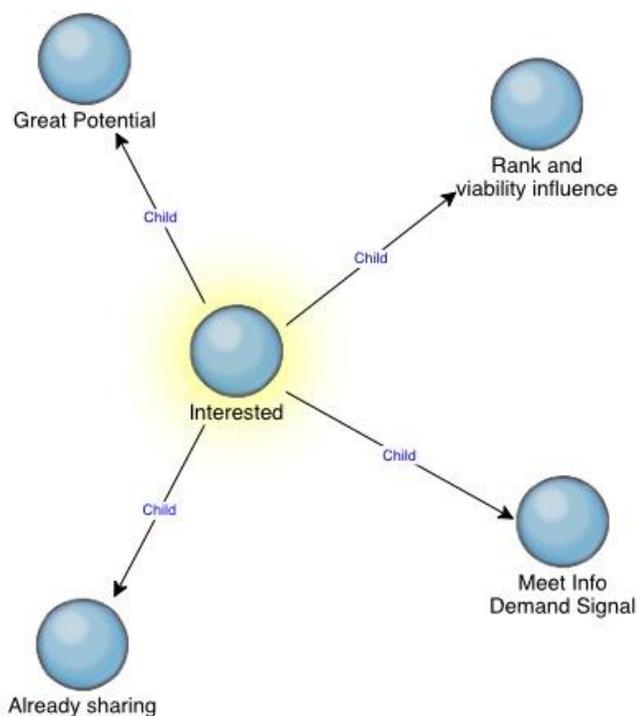


Figure 9. Themes surrounding afloat members' interest in virtual knowledge-sharing.

One member who was interested in sharing knowledge noted:

I think there is a lot of opportunity to really grow a repository of knowledge for the afloat community. It would be nice to look up and connect with cutterman who have done evolutions, missions, or addressed leadership issues that you haven't done yet but are about to. Sometimes my own network doesn't always have a subject matter expert and we have to talk out what we think the best solution is going to be.

Some members were interested in virtual knowledge-sharing because they felt there was not only an “opportunity,” as described above, but a gap in the existing available knowledge. One member noted, “We're becoming a more information-centric service, I think. So us just providing people access has not eliminated the need for us to frequently and virtually communicate with cutters.” Regarding the types of information that interested members desired, lessons learned were repeatedly mentioned. One member explained, “You should be able to take some of those lessons learned, and it should help you. From simple things like, you know, ‘I had this thing in the engine room.’ Well, everyone else on that NSC [National Security Cutter] should have the same thing.” Members also referenced a desire to share positive and negative information similar to the lessons learned concept on a larger scale, acknowledging that failure should be expressed openly and honestly with the entire community. One member acknowledged, “We tend to only ask there, where that mistake is made and if we ask the community as a whole, I think your solutions or your lessons learned if you wanna call that, would be even more robust.” The potential for a virtual forum to expand the breadth and depth of information shared throughout the community was appreciated.

Career viability and rank influence were also referenced by members interested in virtual knowledge-sharing. Specifically, senior members noted that their time in service

and job security positively influenced their desire to contribute. One interviewee quipped of her willingness to share knowledge virtually, “There's no hesitation because I'm at the part of the organization where they pretty much near have to fire me.” Regarding seniority, this member also stated:

I think the seniority has effected that. I'm trying to think if I was that O-2 again, and this was the new thing, I don't know that I'd be, because of the tweeting and all of that stuff, at that time the things that I said and shared, if that got out, that could have probably been the halting and ending of my career.

Rank was a less prevalent influence on members' interest in virtual knowledge-sharing than on their comfort level. Rank influence was also referenced positively here, whereby seniority made this individual more open and willing to share information in a virtual forum with a wider audience.

Not Interested in Sharing Knowledge Within a Virtual Forum

Of the seven survey respondents that did not affirm interest in sharing knowledge in a virtual forum, three members explained that they prefer to share knowledge in smaller groups of select individuals. When describing their interest in virtual knowledge-sharing, members raised concerns regarding the validity of information were raised. One member stated he would only be interested in virtual knowledge-sharing if it was officially vetted and promulgated through policy. Regarding policy, one survey respondent explained:

Not interested if that information does not eventually get evaluated and adjudicated by the responsible program. Knowledge sharing that does not get integrated into policy or TTP could increase risk in mission execution due to perpetuation of knowledge that, although it may work, isn't supported in policy.

Others noted a lack of interest due a lack of vision or concept development. One member explained, “Low [interest]... I see a benefit in the collection of knowledge and having it in a more modern format that could benefit future cuttermen. But I'm not fully understanding conceptually when and how it would all work.” Ultimately, the need for a mature vision and organizational ownership and direction of a virtual forum was influential to those who expressed zero to low interest.

Topic Dependencies and Management Concerns

Members that were interested in sharing knowledge in a virtual forum delineated topics that they were not comfortable addressing virtually. There were types of information that interested members did not want to see in a virtual forum. Specifically, information that could involve sensitive personnel or security matters was of concern to members. One individual cautioned, “Too much knowledge in the hands of people who would do bad things with that knowledge, in today's age, and in the Coast Guard, can affect your career. It's a given.”

When discussing their interest in virtual knowledge-sharing, forty percent of participants addressed some form of maintenance, management, or virtual infrastructure concerns. One member explained, “I think it will be tough to maintain. I think interest will be high at first and will naturally wean with time.” Members also acknowledged that their interest in a virtual forum did not extend beyond participation. One member stated, “I would participate but probably not lead the efforts to organize.” Virtual infrastructure issues, cultural acceptance, and management were also referenced as challenges to maintaining a virtual forum. One member explained, “I think we would have to make virtual communications more culturally popular in the Coast Guard for that to start to

bleed into the operations afloat community more as like an expectation.” Management concerns involved facilitation and administrative oversight. One member explained, “Some type of editing assistance might be helpful...Otherwise, you end up with all kinds of stuff in the forum...Editing guidelines would be helpful. And the strength & wisdom of the monitor is also important.” Similarly, some members considered membership management critical to communal sustainment. One member explained, “I think you need to know who's participating, who the membership is of the group. Not for deciding whether to join or not, but you need to know your audience when you're doing that type of professional exchange.” Effective management of the source, quantity, and quality of information was a priority to those members who expressed interest in participating in virtual knowledge-sharing.

Virtual Infrastructure Considerations

When describing their interest in sharing knowledge virtually, members also noted cultural and functional considerations related to virtual infrastructure. One interviewee felt that afloat culture was not in tune with virtual knowledge-sharing. This member stated, “I think we would have to make virtual communications more culturally popular in the Coast Guard for that to start to bleed into the operations afloat community more as like an expectation.” Although members didn't explain why they felt that virtual knowledge-sharing was not part of afloat culture, they did affirm that there is a lack of opportunity, capability, and tools for virtual exchange. When describing communal interest with sharing mistakes and lessons learned virtually, one survey respondent explained, “Resistant, likely because of internet connectivity issues underway and general lack of time/awareness of benefits.” Another interviewee explained, “So we don't really,

I don't know. We have a ton of information in our head, I think a ton of people wanna share it, and I just don't think there's good tools to get it out there.” Similar to the lack of tools, digital footprint concerns reduced members’ interest in virtual knowledge exchange. One survey respondent described, “You know, just my day to day I don't have a lot of social media footprint and I don't really post a lot online, so I think it would have to be really valuable to me to feel there was an investment to be made there, right?” Similarly, an interviewee explained, “But in the virtual environment, when you put it out there and it's there forever, I think people are less inclined to ask a question that might be perceived or received in a negative context or make you look like you are either violating the trust of somebody else or that you don't know what you're doing.” The permanence and lack of control associated with virtual knowledge-exchange was expressed by members with digital footprint concerns.

In addition to cultural concerns, members described functional attributes of a virtual forum that they considered desirable. Convenience, accessibility, and familiarity were important to members. One interviewee explained:

I think we've got to make it something that's easy to do. Here's the example, so let's say we've got a virtual environment, and you go in and you moor up and you have your hot wash, and you take some notes, and you go down to the cabin or you go down, the XO is going to do it or ops is going to put some information, how do we do that? Can we access it from the Coast Guard internet, can it be done on a bandwidth that you have while you're underway, so that you can do that? What if you have, you're running a go fast case? How do you do it when it's still kind of fresh in your mind, and how do we make it easy, you know so how do you catalog these things.

This member considered convenience important to a successful virtual forum and described dynamic circumstances in which members would employ virtual knowledge-sharing capability. Another member described, “I have some interest. It would be

particularly useful if it was easily searchable and cross-referenced. That's a problem with the current portal pages: documents usually only get filed under topic or platform.” The ability to access information in a convenient matter was influential to members’ interest in virtual sharing. Additionally, members expressed the desire to use known tools such as the portal, or another online repository of information. One survey respondent explained, “Would prefer to see the CG Portal pages organized and better managed for knowledge sharing. That's how I think it would be best served. Right now, it's too haphazard and not maintained.” An interviewee echoed this sentiment regarding the desire for a portal. The member stated, “Yes. I definitely think I would be, in terms of a portal system, or some kind of online knowledge management system, would be my preference.” Although members referenced shortcomings associated with the portal, this forum was consistently referenced as a standard through which improved knowledge maintenance and indexing could be achieved.

Anonymity

Members’ preferences and perceptions of anonymity in a virtual knowledge-sharing forum were a major finding from this case study. The pilot study revealed that the option for anonymous knowledge-sharing was preferred by some afloat members to promote open discourse and reduce scrutiny. Although some members did state that they desired anonymity, the majority of survey respondents and interviewees did not desire anonymity. To explore afloat members’ opinions of anonymous knowledge-sharing, interview and survey questions outlined in Table 10 addressed this topic. Categories supporting anonymity, including benefit, negative influence, no influence, and caveats, are illustrated in Figure 10.

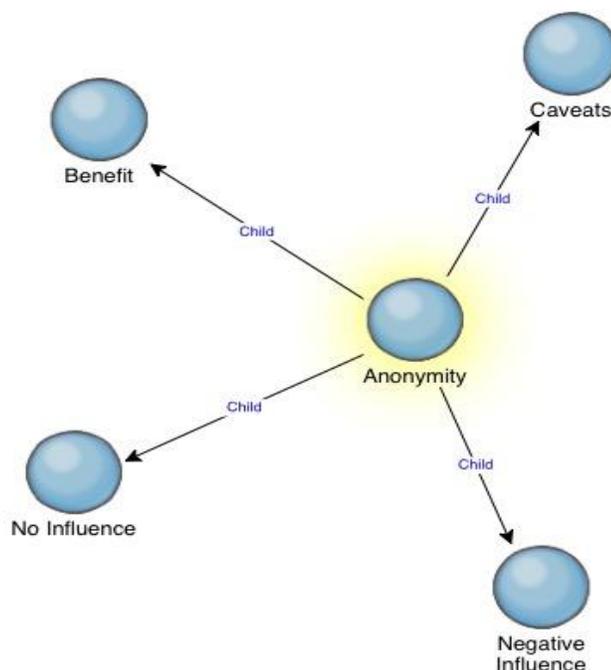


Figure 10. Categories supporting anonymous knowledge-sharing.

The primary benefits of anonymity were the potential to overcome the challenges of a poor command climate, small organization, and rank disparity. Sixty percent of participants noted that anonymity would have either a negative or negligible influence, as opposed to a positive influence, on virtual knowledge-sharing. Members that described a negligible influence considered the USCG too small to have true anonymity. Members felt that comments regarding a mistake or lesson learned could typically be identified regardless of whether a name was associated with it. Members who considered anonymity a negative influence felt that it may reduce personal accountability or prevent quality judgment or further discussion. Lastly, members who were open to anonymity noted some caveats that would have to be address prior to implementation, including optional anonymity and rules for engagement. These themes and supporting data are outlined in Table 29.

Table 29 Themes with Supporting Categories and Data Detailing Afloat Members' Perceptions of Anonymity in Virtual Knowledge Exchange

Research Question 3: How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

Themes:

- Anonymity may encourage virtual knowledge-sharing for junior members, but may deter others who desire personal accountability.
- The option for anonymity would have little influence on virtual knowledge-exchange within the afloat community.

Categories:

- Anonymity may help overcome the challenges to virtual knowledge-sharing posed by a poor command climate, small organization, and rank disparity.
- Anonymity may reduce personal accountability or prevent quality judgment or further discussion.
- Anonymity would have a negligible influence on knowledge-sharing because of the USCG is too small to prevent personal identification.
- Anonymity should be optional and regulated if implemented.

Pattern Codes: Good for juniors; outside the lifelines; overcome poor climate; overcome smallness; personality dependent; option for A and Non A; rules; fear of unknown; no accountability; out of hand; prevents quality judgment; put name on it; digital footprint fears; no true anonymity

Sample Survey "I would share the same either way, but anonymity would be a
 Quotes: game-changer for the less confident/junior folks;" "Editing
 guidelines would be helpful. And the strength & wisdom of the
 monitor is also important"; "That is important. Anonymous
 would be key. But I also think it could degrade the quality of the

forum. You could get some disgruntled people ranting and raving”; “Anonymity might help, but our community too small to offer true anonymity”

Sample Interview
Quotes:

“I think there's an outside the lifelines thing that has to, you know we'd have to get over that. Anonymity I think would be crucial to be able to do that”; “But I think you'd have to have it both ways, anonymity, but you can add your information if you want”; “When things are anonymous I think anonymous is kind of a double-edged sword. It may make some people be more honest, but I think it might also make some people because, they're not accountable for what they put out there, become less honest and more embellishing, right? I think it would be more accurate if it was anonymous you may not get as much detail, but I think the details would be more accurate”; “No way, how, shape, or form would I be comfortable in an anonymous form. Not because I'd worry about, because I'm at the point where I'm not worried about my career, where I'm going next, people's, my professional reputation after 22 years of working hard. I'm comfortable where I am professionally, but I'm not comfortable with the unknown”; “With the digital age, some people are still worried, it's going to get traced back to me. I put it on there, they're going to know it's me”

Benefit

Members who viewed anonymity as a positive influence in virtual knowledge-sharing discussed benefits such as a lack of attribution and a means for overcoming a poor climate, where disclosure was potentially limited. One member explained, “Adding an anonymous feature would allow lessons to be shared without repercussion, and people can still learn from private situations.” Members also believed that anonymity may increase participation from more junior members. One member commented, “I would share the same either way, but anonymity would be a game-changer for the less confident/junior folks.” Other members had a different perspective on rank and anonymity with regard to the officer and enlisted workforce. Two members who were commissioned officers with prior enlisted service stated that anonymity would be more influential to them as an officer than as an enlisted member. One member commented, “I may be more willing to share more controversial information than I would be, especially as a commissioned officer.” Similarly, when discussing virtual knowledge-exchange, the other member stated, “Now an enlisted person? I don't know that they'd feel as much consequence. I've been enlisted. I'll be honest, I was pretty non-stressed about it, right?” These members both felt that the relative seniority of an officer may increase the perception of risk involved with virtual knowledge-sharing, particularly with regard to mistakes or lessons learned. In turn, these members thought anonymity would encourage virtual knowledge-exchange for officers versus enlisted members.

Members who felt that anonymity would positively impact virtual exchange also believed that it would help overcome the challenges of familiarity and politics within a small service. One member explained:

We are a small service, so non-anonymous sharing has the downfall that we largely know one another and I could see issues both from an attribution standpoint as well as from the point of view of disregarding someone because you don't care for them.

Other members felt that anonymity would increase overall knowledge-exchange and help members extend their knowledge and experiences outside of their unit. One interviewee explained, “I think there's an outside the lifelines thing...we'd have to get over that. Anonymity I think would be crucial to be able to do that.” Similar to the impact of the nautical term “lifelines” when discussing reciprocity and concerns about sharing mistakes and lessons learned, it lends a similar sense of criticality to anonymity. Members felt that information was safe within the lifelines, but virtual knowledge-sharing dramatically expanded the scope of knowledge-sharing. These members, in term, viewed anonymity as a necessary step in securing members’ identities to achieve greater information exchange.

Negative Influence

More members noted either negative or negligible consequences associated with anonymous knowledge-sharing than positive consequences. Codes supporting the negative influence of anonymity are illustrated in Figure 11.

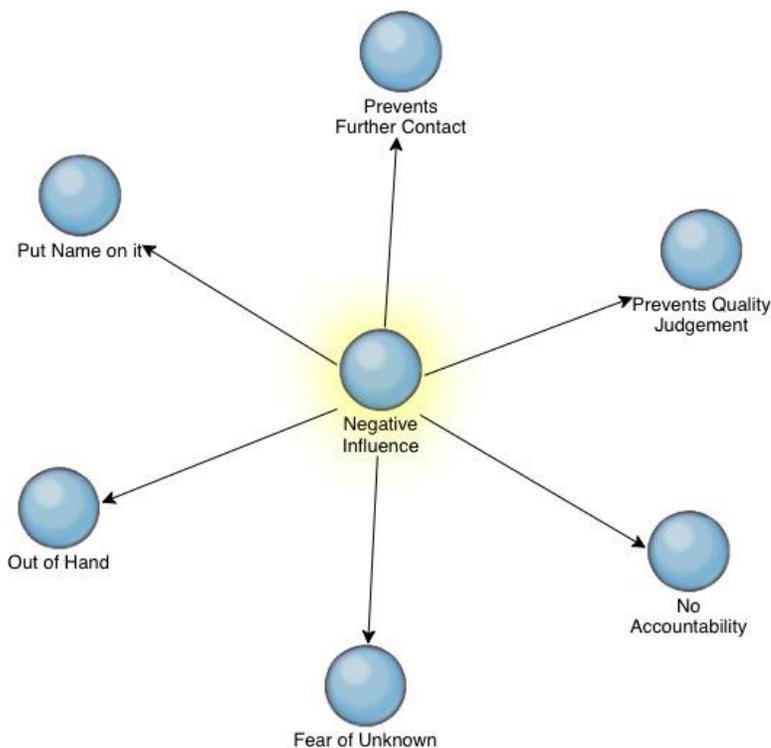


Figure 11. Codes supporting the negative influences of anonymity.

Most notably, members thought that anonymity would remove a sense of personal accountability with the information exchanged that could result in unprofessionalism or misinformation. One member explained, “I think anonymous sharing in a close-knit community would enable people to be more brazen than open and thoughtful in their postings and/or responses.” Similarly, another member noted, “I also think it [anonymity] could degrade the quality of the forum. You could get some disgruntled people ranting and raving.” Other members used the colloquialism, “trolls,” to describe potential critics that may inundate the forum with inappropriate contributions and comments.

There was also a prevailing sentiment that anonymity prevented quality contributions and judgments in a virtual forum. Members believed that the community should want to attach their names to contributions. Some members felt that anonymity

would prevent others from being able to connect outside of the virtual forum and further discuss a topic or share additional experiences. One member explained:

I'm not particularly big on doing things anonymously. If I'm going to post something, particularly with the understanding that it's going to be my peers, or somebody trying to do the same job reading it, then they can pick up the phone and call me and talk to me about it, if they're having a problem, if they don't want to post an instance.

Members repeatedly made statements emphasizing the need for identification and accountability, including "I'd rather sign my name," and "Put a name to it." One member emphasized, "You put your name on it and stand behind it." Another member explained, "I think that [anonymity] could encourage knowledge sharing, but without knowing the experience of the person sharing the knowledge the value of the shared info may be questioned." These members desired judgment, which was seen as a deterrent to knowledge sharing by those who desired anonymity. One member stated, "If I don't know who the person is or what their credentials are in passing lessons learned, then I have no means on knowing the quality of the information passed." Members' need and desire to judge others by their experiences further supports the close-knit nature of the afloat community. Individuals are recognized by name and judged by their service reputation.

Negligible Influence

Members who felt anonymity would have a negligible influence on virtual knowledge-sharing believed that the afloat community was too small for legitimate anonymity. One member explicitly stated, "Our community is too small to offer true anonymity." Other members felt that anonymity could not overcome digital footprint concerns, which deterred some members from virtual knowledge-sharing. One member explained, "It's just I don't know if you can ever be truly anonymous because of that

digital footprint in a virtual environment.” This member felt that the digital identity associated with virtual contributions could not be overcome through anonymity.

Caveats

In addition to offering their overall disposition towards anonymous knowledge-sharing, some members offered recommendations on implementation. These recommendations were expressed in the form of caveats, or conditions under which anonymity could be successfully employed in virtual knowledge-exchange. Members felt that anonymity should be optional in a forum, whereby members could choose whether or not to attach their names. One member explained, “But I think you'd have to have it both ways, anonymity, but you can add your information if you want...some people would want to say, "Yeah, give me a call if you want to learn more about this.” Other members expressed the need for “rules” with anonymous knowledge-sharing and “editing guidelines” that would help ensure that members engaged in an appropriate and professional manner.

Research Question Three Summary

Research question three explored afloat members’ disposition towards knowledge-sharing in a virtual forum. Data was collected through survey and interview questions that addressed members’ comfort, experience, and interest in virtual knowledge-sharing. Communal comfort level and the influence of anonymity in members’ disposition towards virtual knowledge-sharing were also explored. The majority of participants felt that anonymity would have a negative or negligible impact on virtual knowledge-sharing. Additionally, the majority of afloat members expressed some degree of comfort with virtual knowledge sharing, citing altruism and the desire to

help others learn as significant influences in their desire to share. Members that were not comfortable sharing noted digital footprint concerns, rank disparity, and generational influences as potential deterrents. With the exception of six study participants, all members possessed some degree of experience with virtual knowledge-sharing. Members who preferred face-to-face knowledge-exchange desired interpersonal interaction and organic classroom engagement. Members who preferred the online experience found it more challenging and favored the opportunity for autonomous learning and planned interactions. The majority of afloat members expressed interest in virtual knowledge-sharing, but considered effective management and facilitation of the forum essential to successful knowledge-exchange and sustainability.

Chapter Summary

Chapter four included an in-depth analysis of the findings from this case study collected through an open-ended survey and semi-structured interviews. By analyzing data from each of the three research questions, themes supporting the afloat community's potential for engagement in a virtual community of practice emerged. This case study's major themes included altruism, communal aversion to mistakes, perceptions regarding virtual infrastructure limitations, anonymity concerns, and the desire for management and facilitation.

Research question one explored how members of the afloat community describe their willingness to share knowledge with other members. Affirming the results of the pilot study, members explained that they shared knowledge with the afloat community, but expressed a variety of tools and frequencies in which they share knowledge with other members. Altruism and members' job description were significant influences in the

manner, frequency, and forum in which they engaged with the afloat community.

Research question two explored how members of the afloat community described their ability to trust other members with information regarding mistakes or lessons learned on the job. Members expressed greater confidence in individual comfort levels with sharing mistakes and lessons learned than communal comfort levels with sharing this information. The major findings highlighted the afloat culture's intolerance for mistakes, judgment, and concerns regarding service reputation and its potentially negative impact on knowledge exchange. The findings also reinforced altruism as a significant and positive influence in communal knowledge exchange.

Research question three explored afloat members' disposition towards knowledge-sharing in a virtual forum. Afloat members expressed varying degrees of comfort and interest with sharing information in a virtual forum. With the exception of 6 study participants, all members possessed some degree of experience with virtual knowledge-exchange. Altruism and the desire to help others learn were prominent influences in members' comfort and interest in sharing in a virtual forum. Digital footprint concerns, along with rank and generational influences, were considered challenges to virtual knowledge-exchange. Effective management and facilitation were considered essential to sustainable knowledge-exchange and communal engagement.

CHAPTER 5: SUMMARY OF FINDINGS

The purpose of this qualitative case study was to explore how the knowledge-sharing culture of the afloat community is suited for Virtual Community of Practice (VCoP) engagement. The afloat community's knowledge-sharing culture referred to member's overall willingness to share knowledge, perceptions of trust and knowledge reciprocity, and disposition towards online learning. These cultural elements were examined because research revealed that they are dominant influences in the viability and sustainability of VCoP. Specifically, consistent knowledge-sharing is necessary for communal sustainment (Lin et al., 2009; Usoro et al., 2007). In turn, trust, knowledge reciprocity, and disposition towards online learning are major influences in members' willingness to share knowledge (Ardichvili et al., 2003; Lin et al., 2009; Usoro et al., 2007). As a member of the afloat community and a performance support and training analyst for the USCG, I perceived the flexibility and accessibility of a VCoP well aligned to the challenges that afloat members experience, including dynamic operational schedules and geographic segregation. The results of a pilot study affirmed that afloat members were interested in these affordances and willing to share knowledge virtually, but also revealed communal concerns with exchanging information regarding mistakes and lessons learned. Fifty percent of pilot study participants also expressed the desire for anonymous knowledge-sharing to protect them from perceived scrutiny when sharing information on mistakes and lessons learned. This research expanded upon the pilot

study's findings surrounding communal trust and anonymous knowledge-sharing within the afloat community.

A qualitative case study methodology provided a detailed exploration of the afloat community's knowledge-sharing culture. Data was collected from 39 open-ended survey responses and 12 semi-structured interviews of afloat members with varying degrees of sea time and time in service. 41 males and 10 females participated in this study. A hybrid first cycle coding strategy consisting of structural and in vivo coding was employed. Pattern coding was employed during the second cycle to consolidate and synthesize codes into categories and themes. The study was based on the following three research questions:

- How do members of the afloat community describe their willingness to share knowledge?
- How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?
- How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

In this chapter, the seven major findings of this study will be summarized to qualify the afloat community's potential for engagement in a VCoP. Major findings included:

1. The afloat community shares knowledge frequently, but this frequency is greater when stationed afloat vs. ashore.
2. Altruism and the desire to help others enhances trust and knowledge reciprocity in the afloat community.

3. Preserving one's service reputation within the small, highly competitive, and mistake-adverse afloat community is paramount and may limit members' willingness to share information on mistakes and lessons learned.
4. Digital footprint concerns, generational inclinations, and rank disparity influence members' interest and comfort with sharing knowledge virtually and their ability to trust other members with information regarding mistakes and lessons learned.
5. Afloat members appreciate the efficiencies of virtual knowledge-sharing, but also desire the interpersonal engagement afforded by a face-to-face learning experience.
6. Management, facilitation, and functional virtual infrastructure are essential attributes of a VCoP for the afloat community.
7. Anonymous knowledge-sharing is highly contested within the afloat community and may deter participation in a VCoP.

Implications for establishing and sustaining a VCoP for the afloat community will also be discussed. This chapter concludes with a description of research limitations and suggestions for future areas of study.

Reviewing the Findings

There were seven major findings related to afloat members' willingness to share knowledge, ability to trust other members with information involving mistakes and lessons learned, and disposition towards learning in a virtual environment. Each of these findings will be applied to answer the three research questions in the study. The concept

of virtual learning that is implicit within these results aligns with this study's definition of VCoP, along with survey and interview questions that referenced synchronous and asynchronous virtual forums, including blog posts and online classrooms. The study's theoretical framework, including legitimate peripheral participation, situated learning, Social Exchange Theory (SET) and Social Cognitive Theory (SCT) will be applied to the findings to describe the afloat community's potential for engagement in a VCoP.

Research Question 1: Afloat Members' Willingness to Share Knowledge

The study's first major finding was that afloat members share knowledge frequently, but this frequency is greater when stationed afloat vs. ashore. This finding addressed the first research question, "How do members of the afloat community describe their willingness to share knowledge?" Findings, supporting literature, and practice implications for research question one are listed in Table 30.

Table 30 Major Findings, Literature, and Practice Implications Supporting Research Question One

Research Question 1	How do members of the afloat community describe their willingness to share knowledge?	
Major Findings	1. Afloat members share knowledge frequently, but this frequency is greater when	2. Altruism and the desire to help others enhances trust and knowledge reciprocity in

	stationed afloat	the afloat
	vs. ashore	community
Supporting Literature	Consistent	Altruism has a
	knowledge-	positive
	sharing is a	impact on
	hallmark of	both trust and
	successful	knowledge-
	VCoP and an	sharing within
	indication of	CoP (Chen et
	communal	al., 2014;
	engagement and	Wasko &
	participation	Faraj, 2000).
	(Lin et al.,	
	2009; Usoro et	
	al., 2007).	Altruistic
		knowledge-
	Frequent	sharing, as
	knowledge-	opposed to the
	sharing	desire for
	provides	knowledge
	opportunities	reciprocity,
	for social	may help
	engagement and	prevent

observation	communal
foundational to	attrition, one
social learning,	of the greatest
aligned with	risks to VCoP
SCT (Bandura,	sustainability
1986).	(Johnson,
	2001).

Learning in a
CoP occurs
through
“legitimate
peripheral
participation,”
(Lave &
Wenger, 1991,
p.29). By
sharing
knowledge
frequently,
afloat members
are generating
and partaking in
opportunities

for learning and
communal
engagement
necessary for
VCoP viability

- Practice Implications
- Afloat members need to have an IT infrastructure capable of supporting virtual knowledge-sharing while they are underway.
 - Tools must be selected with members' preferences and lifecycle cost and sustainability considerations at the forefront.
-

Eighty-six percent of participants affirmed that they share knowledge on a routine basis with the afloat community. Consistent knowledge-sharing is a hallmark of successful VCoP and an indication of communal engagement and participation (Lin et al., 2009; Usoro et al., 2007). Affirming that the afloat community shared knowledge frequently corroborated the results of the pilot study and helped qualify the afloat community's potential engagement in a virtual community. Lave and Wenger (1991) posed that learning in a Community of Practice (CoP) occurs through "legitimate peripheral participation," (p.29) as new learners acquire knowledge by becoming active and involved with the community. By sharing knowledge frequently, afloat members are generating and partaking in opportunities for learning and communal engagement which are necessary for VCoP viability. Similarly, frequent knowledge-sharing provides opportunities for social engagement and observation. This finding is aligned with SCT,

whereby learning occurs when individuals are able to witness others modeling a behavior and then apply the observation to their own performance (Bandura, 1986).

In addition to confirming that members share knowledge frequently, the first finding highlighted that afloat members share knowledge more frequently when stationed afloat vs. ashore. Over thirty percent of participants prefaced their statements regarding the frequency of knowledge-sharing by distinguishing whether they were stationed afloat or ashore. Members described a few exceptions to this finding, whereby they may share more frequently when stationed ashore if their job directly supports the afloat community. Overall, however, members considered knowledge-sharing to be more prevalent when stationed afloat and related this frequency to the need for a specific type of information that may be time-sensitive or mission critical. Members described instances in which they reacted to a sudden need for information or some aspect of a mission that they would not necessarily encounter when stationed ashore. These instances and their associated acquisition of knowledge are indicative of situated learning, whereby knowledge is obtained in the environment in which it is applied (Johnson, 2001). Johnson (2001) advised that learners should engage in “complex, messy problem-solving,” (p. 47) whereby they learn by doing. VCoP may provide a forum through which members can more easily reach out and exchange information as complex situations arise within their respective operational environments. Afloat members’ contentions that they share knowledge more frequently while underway than ashore also aligns with situated learning theory. If knowledge is situated, it is logical that afloat members would seek out information on underway operations and missions while they are operating in this environment. Similarly, members stationed ashore in positions that directly support the

afloat community would learn and apply knowledge situated within the afloat community, but not necessarily on board a ship.

The second major finding of this study was that altruism and the desire to help others enhance trust and knowledge reciprocity within the afloat community. The impact of altruism on knowledge-sharing supports research question one, whereas the relationship between altruism and trust will be addressed in response to research question two. Research revealed that altruism had a positive impact on both trust and knowledge-sharing within CoP (Chen et al., 2014; Wasko & Faraj, 2000). Sixty percent of interviewees and thirty-eight percent of survey respondents noted that they reciprocate knowledge for the benefit of others. These members described “helping” others. Three survey respondents explicitly stated that they don’t provide information to others with the expectation of getting information back. This statement runs counter to the norm of reciprocity. Grounded in SET, the norm of reciprocity refers to expectations regarding the amount of knowledge shared and implies that members share knowledge in accordance with the quantity and quality of information that they expect to receive from others (Blau, 1964; Chen & Hung, 2010; Cheung, Lee, & Lee, 2013; Lin et al., 2009). Participants in this study, however, did not share information for the purpose of getting a response from others. Rather, as one survey participant poignantly described, “Cutter folks share knowledge with each other so that we can make it through the day, season, tour, etc. Again, I don't share knowledge expecting that someone else will, in return, share knowledge with me.” The positive impact of altruism on knowledge-sharing bodes well for communal sustainability. Attrition due to a lack of knowledge-sharing is one of the greatest risks to a VCoP (Johnson, 2001). If afloat members are willing to share

information with others regardless of the amount of information that they receive in return, overall communal participation may be positively impacted. In turn, members may be less likely to leave the community due to inactivity.

The first two major findings of this study answered the first research question and supported the notion that afloat members are willing to share knowledge with other members to benefit the greater good. These findings also corroborated the researcher's experience and the results of the pilot study in which six afloat members affirmed that they share knowledge frequently with members of the afloat community. The influence of altruism aligned with my own experience and research regarding knowledge-sharing influences within the public sector. In public sector organizations geared towards service and humanitarian efforts, such as the USCG, members often have an altruistic desire to contribute to the greater good (Camilleri & Van Der Heijden, 2007). Altruism, as opposed to reciprocity, guided afloat members' decisions to share knowledge.

Research Question 2: Afloat Members' Ability to Trust Other Members with Information Regarding Mistakes or Lessons Learned

The study's second major finding also addressed the relationship between altruism and trust and helped to answer the second research question, "How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?" Findings, supporting literature, and practice implications for research question two are listed in Table 31.

Table 31 Major Findings, Literature, and Practice Implications Supporting Research Question Two

Research Question 2	How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?		
Major Findings	2. Altruism and the desire to help others enhances trust and knowledge reciprocity in the afloat community.	3. Preserving one's service reputation within the small, highly competitive, and mistake-adverse afloat community is paramount and may limit members' willingness to share information on mistakes and lessons learned.	4. Digital footprint concerns, generational inclinations, and rank disparity influence members' interest and comfort with sharing knowledge virtually and their ability to trust other members with information regarding

			mistakes and lessons learned.
Supporting Literature	Willingness to share information on mistakes and lessons learned to prevent future accidents at sea reflects the humanitarian elements of knowledge- sharing within public sector communities (Camilleri & Van Der Heijden, 2007).	Communal concerns regarding trust may limit knowledge- sharing and prevent legitimate peripheral participation, which Lave and Wenger (1991) considered essential to communal learning.	Concerns regarding rank disparity may limit trust and potentially reduce knowledge- sharing and legitimate peripheral participation within a VCoP for the afloat community (Johnson, 2001; Lave & Wenger, 1991).

- Practice Implications
- To enhance trust and encourage knowledge-sharing, virtual communication may be augmented with face-to-face community meetings (Ardichvili et al, 2003; Usoro et al., 2007).
 - Team leadership may offer a viable approach and alternative to rank based leadership through which afloat members can understand and tackle issues through a group lens, rather than through individual efforts.
 - Anonymity may enhance some members' willingness to share information regarding mistakes and lessons learned.
- Given the diversity of opinion and concerns regarding personal accountability and information control, anonymous knowledge-sharing should not be pursued without additional analysis and insight into implementation options.
-

Altruism was the most prominent, positive influence on members' decision to share information on mistakes or lessons learned. Over thirty percent of respondents, including fifty percent of interviewees, attributed their willingness to share information on mistakes or lessons learned to the perceived educational or safety value of this information. Members trusted that the community would respect this information because it would benefit the greater good and possibly prevent mishaps. These findings aligned with literature describing positive relationships between altruism and trust in knowledge-sharing communities. More specifically, this willingness to share information on mistakes

and lessons learned to prevent future accidents at sea reflects the humanitarian elements of knowledge-sharing within public sector communities (Camilleri & Van Der Heijden, 2007).

The third major finding in this study was that preserving one's service reputation within the small, highly competitive, and mistake-adverse afloat community may limit members' willingness to share information on mistakes and lessons learned. Twenty percent of respondents specifically referenced their reputation when describing their comfort with sharing mistakes or lessons learned. Other members referenced more general concerns regarding judgment or scrutiny that may arise if they revealed their experience with a mistake or lessons learned. Afloat members placed a high value on their reputation and were keenly aware of the potential vulnerability. This sense of vulnerability was compounded by the small, mistake-adverse and competitive culture that they perceived within the afloat community. Fifty-eight percent of interviewees and eighteen percent of survey respondents referred to the afloat community as "small." One-third of interviewees also referenced afloat culture when describing barriers to sharing mistakes, including a prevailing anti-mistake, competitive mentality. Three interviewees distinguished between sharing a mistake vs. a lesson learned, explaining the community was more forgiving if an error was couched as a "lessons learned" vs. a mistake. Communal concerns regarding trust may limit knowledge-sharing and prevent legitimate peripheral participation, which Lave and Wenger (1991) considered essential to communal learning. Although members' concerns regarding service reputation were explicitly described within survey and interview responses, there were far more references to altruism and sharing knowledge for the sake of the greater good. Altruism

may, therefore, counter some members' reservations with sharing mistakes and lessons learned and enhance trust.

The fourth major finding in this study was that digital footprint concerns, generational inclinations, and rank disparity influence members' interest and comfort with sharing knowledge virtually and their ability to trust other members with information regarding mistakes or lessons learned. The influence of rank disparity on members' ability to trust others with information regarding mistakes and lessons learned supports research question two. Senior members considered rank instrumental to their willingness to share information on mistakes and lessons learned. One-third of interviewees, along with three survey respondents, referenced their job security or retirement eligibility when describing their willingness to share mistakes and lessons learned. A senior interviewee declared, "There's no hesitation [with sharing information] because I'm at the part of the organization where they pretty much near have to fire me." Conversely, members perceived junior members less likely to share information on mistakes and lessons learned because of perceived risks to service reputation and career viability. Junior members described themselves as less comfortable sharing information on mistakes and lessons learned with senior members than with peers or those junior to them, which may limit communal participation. Legitimate peripheral participation theory ascribes that learners start at the periphery of their community when they have accrued minimal knowledge, and they move towards the center of activity and participate more fully as they learn from more experienced and skilled community members (Johnson, 2001). The roles of junior and senior afloat members may be applied to this theory, whereby junior members must learn from their engagement with more senior

members. In turn, senior members should be willing to impart juniors with information necessary for their learning and development. Concerns regarding rank disparity may limit trust and potentially reduce knowledge-sharing and legitimate peripheral participation within a VCoP for the afloat community.

The second major finding in this study supported the notion that afloat members trust other members with information regarding mistakes or lessons learned when this information benefits the greater good. Afloat members are more willing to share information regarding errors to prevent mishaps and enhance communal safety and wellness. This willingness, however, may be limited by members' concerns regarding their service reputation or career viability. The third and fourth finding, involving the influences of service reputation and rank disparity, reveal that members are less willing to share information when they associate scrutiny and judgment with their disclosure. These findings corroborated the results of the pilot study, revealing the limitations of communal trust in the afloat community between disparate ranks and situations in which one's professional reputation could be marred. There were also major distinctions noted between individual and communal comfort with sharing mistakes and lessons learned. Sixty percent of participants considered themselves comfortable with sharing mistakes and lessons learned, but only ten percent of participants described this level of comfort within the afloat community at large. The answer to research question two, that afloat members have a limited ability to trust other members with information on mistakes and lessons learned, also aligns with the researcher's experience. Afloat members possess a genuine altruistic desire to help others, but there is also a sense of vulnerability compounded by the community's relatively small population within the USCG, the

smallest of the five armed services. The community can be unforgiving. One interviewee described a “hang our own young,” approach among afloat members. The influence of altruism may enhance communal trust, but may not overcome members’ perceived vulnerability with sharing mistakes and lessons learned with disparate ranks in this small community where reputation is paramount.

Research Question 3: Afloat Members’ Experience, Interest, and Comfort with Virtual Learning

Experience with Virtual Learning

The fifth major finding in this study was that afloat members appreciate the efficiencies of virtual knowledge-sharing, but also desire the interpersonal engagement afforded by a face-to-face learning experience. This finding described afloat members’ experience with virtual learning addressed in research question three, “How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?” Findings, supporting literature, and practice implications for research question three are listed in Table 32.

Table 32 Major Findings, Literature, and Practice Implications Supporting Research Question Three

Research Question 3	How do members of the afloat community describe their ability to trust other members with information regarding mistakes or lessons learned on the job?			
Major Findings	4. Digital footprint concerns,	5. Afloat members appreciate the	6. Management, facilitation, and functional	7. Anonymous knowledge-sharing is

	generational	efficiencies of	virtual	highly
	inclinations, and	virtual	infrastructure	contested
	rank disparity	knowledge-	are essential	within the
	influence	sharing, but	attributes of a	afloat
	members' interest	also desire the	VCoP for the	community
	and comfort with	interpersonal	afloat	and may deter
	sharing	engagement	community.	participation in
	knowledge	afforded by a		a VCoP.
	virtually and their	face-to-face		
	ability to trust	learning		
	other members	experience.		
	with information			
	regarding			
	mistakes and			
	lessons learned.			
Supporting Literature	For members to	One of the	Effective VCoP	If members are
	successfully	primary	management	not able to
	participate in a	disadvantages	practices include	positively
	VCoP, they must	that VCoP	the use of	identify others
	have some degree	experience is	accepted virtual	or their
	of technical	the absence of	tools,	professional
	capability and	face-to-face	facilitation, and	credibility,

comfort with interaction, mentorship trust and
 virtual whereby some (Cox, 2005; knowledge-
 communications members may Johnson, 2001; sharing may be
 (Wang & become Kok, 2010; negatively
 Haggerty, 2009). “invisible” Rogers, 2005). impacted (Lin
 (Yao et al.,
 2015, p. 621)
 Positive and in a virtual Members felt
 professional forum that anonymity
 digital presence (Hildreth et may reduce
 and branding may al., 2000). personal
 contribute to Virtual contact. This
 one’s experience lack of contact
 occupational and perceived may further
 health (Edmiston, confidence challenge
 2014; Hewson, may enable VCoP
 2013; Willmer, members to participation
 2009). participate and
 more fully in a sustainability
 virtual forum, (Hildreth et al.,
 potentially 2000; Yao et
 increasing al., 2015).
 interaction and

engagement
critical to
Bandura's
(1986) social
learning
theory.

Knowledge-sharing is positively impacted when members are comfortable revealing the extent and potential limitations of their professional competence (Yao et al., 2015). Anonymity may contribute to this sense of comfort.

Practice Implications - To enhance trust and encourage knowledge-sharing, virtual communication may be augmented with face-to-face community meetings (Ardichvili et al, 2003; Usoro et al., 2007).

- Team leadership may offer a viable approach and alternative to rank based leadership through which afloat members can understand and tackle issues through a group lens, rather than through individual efforts.
 - Given the diversity of opinion and concerns regarding personal accountability and information control, anonymous knowledge-sharing should not be pursued without additional analysis and insight into implementation options.
-

Research revealed that in order for members to successfully participate in a VCoP, they must have some degree of technical capability and comfort with virtual communications (Wang & Haggerty, 2009). Eighty-eight percent of participants affirmed that they possessed some form of experience with learning in a virtual environment and fifty-four percent of participants completed at least one online course, the majority of which were at the graduate level. The breadth of experience expressed by the majority of afloat members in this study reveals that members are capable of participating in a virtual environment. It is interesting to note that six participants denied having any experience with virtual learning, but all members of the USCG must complete general mandated training annually via self-paced electronic learning. Thus, technically, all members of the USCG have engaged in some form of virtual learning.

Although participants were not asked whether they preferred virtual or face-to-face learning, some preferences were specified. These preferences provided greater insight into the afloat community's virtual learning experiences. Of the twenty-five

percent of interviewees that expressed virtual preferences, all four described the efficiencies and challenges afforded by this forum. Specifically, the flexibility, access, and convenience of virtual learning were positively detailed. Additionally, these interviewees described an increased sense of accountability and self-discipline required of virtual learning that positively impacted their experience. Fifty percent of interviewees and two survey respondents, however, described a preference for face-to-face learning and referenced the need for interpersonal engagement. This preference is supported by the literature on VCoP challenges. One of the primary disadvantages that VCoP experience is the absence of face-to-face interaction, whereby some members may become “invisible” (Yao et al., 2015, p. 621) in a virtual forum (Hildreth et al., 2000). To overcome the lack of face-to-face interaction in a VCoP, afloat members should maximize virtual communication. The fifth major finding supports that notion that members possess the technical experience required to participate in a VCoP and that members appreciate the efficiencies that this forum provides. This virtual experience may also enable members to participate more fully in a virtual forum (Wang & Haggerty, 2009). In turn, members may become more engaged and interactive and their learning may be positively impacted as per social cognitive theory (Bandura, 1986).

Comfort and Interest in Virtual Learning

The sixth major finding of this study was that digital footprint concerns, generational inclinations, and rank disparity influence members’ interest and comfort with sharing knowledge virtually and their ability to trust other members with information regarding mistakes and lessons learned. The influence of digital footprint concerns and generational inclinations on interest and comfort with sharing knowledge

virtually supports research question three. Although eighty-six percent of participants were interested in sharing knowledge virtually and seventy-one percent were comfortable, afloat members are still concerned about the permanence and lack of control over their virtual contributions. This finding revealed that afloat members are concerned about the permanence of their contributions to a virtual forum, potentially reducing their overall comfort with sharing knowledge-virtually. Fifty-eight percent of interviewees described concerns related to digital footprint and a lack of control over how information is used and disseminated virtually. These findings aligned with research emphasizing the importance of a positive and professional digital presence to one's occupational health (Hewson, 2013; Willmer, 2009).

Generational inclinations were also found to be influential to members' comfort with virtual knowledge-sharing. One survey respondent with under ten years of service described himself as comfortable with virtual knowledge sharing and a member of "Generation Text." By contrast, one member with over 20 years of service explained, "Maybe younger people could do this better than an old (started afloat pre-GPS) guy like me." Thirty-two percent of participants with over fifteen years of service expressed a lack of comfort with virtual learning. By contrast, of the nineteen participants with less than fifteen years of service, only eleven percent described themselves as less than comfortable sharing knowledge-virtually. These findings support literature regarding the prevalence of virtual professional branding, communication, and networking (Clark, 2011; Edmiston, 2014). Establishing a credible and professional online reputation within academic and corporate environments is highly desirable and often a requirement for students and employees (Edmiston, 2014). Although professional branding is not a new

concept, its virtual application may be more tangible to younger generations, as supported by this study's findings.

The seventh major finding of this study was that management, facilitation, and functional virtual infrastructure are essential attributes of a VCoP for the afloat community. Forty percent of participants expressed a desire for some form of management and capable infrastructure within a virtual forum. One survey respondent described a virtual management construct as a "system of care." When describing both their interest and comfort with sharing knowledge in a virtual forum, participants referenced the need for an effectively managed forum in which discussion content, membership, and infrastructure were consistently vetted and supervised. These desires are supported by research on effective VCoP management practices, including the use of accepted virtual tools, facilitation, and mentorship (Cox, 2005; Johnson, 2001; Kok, 2010; Rogers, 2005). Several participants actually caveated their statements on whether they would participate in a virtual forum with references to management and facilitation. Five interviewees described specific facilitation responsibilities that they considered important to a virtual forum, including updating available references and materials, vetting members, and ensuring that discussion content did not include sensitive personnel or operational issues.

Comfort and Interest in Anonymous Virtual Learning

This study's seventh major finding was that anonymous knowledge-sharing is highly contested within the afloat community and may deter participation in a VCoP. Fifty percent of pilot study participants referenced anonymity as a means to promote knowledge-sharing and overcome concerns regarding service reputation or scrutiny. The

results of the case study, however, were divided approximately into thirds. One third of participants felt that anonymity would have a negative influence, one third felt anonymity would have a negligible influence, and one third felt that anonymity would have a positive influence on virtual knowledge-exchange. Of the sixty percent of participants who considered anonymity a negative or negligible knowledge-sharing influence, members were concerned that anonymity would reduce personal accountability or prevent quality judgment. These concerns are supported by literature regarding communal trust and positive perceptions of communal integrity and competence (Usoro et al., 2007). Specifically, if members are not able to positively identify others or their professional credibility, trust and knowledge-sharing may be negatively impacted (Lin et al., 2009). Additionally, members felt that anonymity would reduce personal contact and prevent continued discussion in the absence of contact information. This lack of contact may further challenge VCoP participation and sustainability (Hildreth et al., 2000; Yao et al., 2015).

Participants that felt anonymity would have a negligible impact on knowledge-sharing considered anonymity impossible within the small population of the afloat community. Members felt that contributions would not remain anonymous because the community is too small and close-knit for members' identities to remain undisclosed. The thirty percent of participants who felt that anonymity would have a positive impact on knowledge-sharing consistently referenced junior members and how anonymity may help overcome concerns regarding rank disparity. One survey respondent stated that anonymity may be a "game changer for the less confident/junior folks." This perception was shared by fifty percent of pilot study participants and supports literature involving

knowledge-sharing and trust. Specifically, knowledge-sharing is positively impacted when members are comfortable revealing the extent and potential limitations of their professional competence (Yao et al., 2015). Anonymity may provide this sense of comfort.

Major findings four through seven addressed research question three regarding afloat members' experience, interest, and comfort with sharing knowledge in a virtual forum. Eighty-eight percent of afloat members possess experience sharing knowledge in a virtual forum and appreciate the efficiencies afforded by virtual knowledge exchange. Although eight-six percent of afloat members are interested in sharing knowledge virtually, digital footprint concerns may reduce this interest and members' overall comfort with virtual knowledge-exchange. Generational inclinations may also reduce senior members' comfort with sharing knowledge virtually, but sixty-seven percent of participants affirmed that they are comfortable sharing knowledge in a virtual forum. Management, facilitation and capable virtual infrastructure were also critical to members' interest and comfort with sharing knowledge virtually. The majority of afloat members felt that anonymity would have a negative or negligible influence on their willingness to share knowledge virtually. This finding conflicts with that of the pilot study and reveals participants' concerns regarding accountability and quality control.

Implications for Practice

The findings of the study have several implications for the future development and sustainment of a VCoP for the USCG's afloat community. Kok (2010) advised that the selected tools for virtual engagement align with learners' preferences and organizational capacity. Given afloat members' concerns regarding underway

connectivity and organizational information technology (IT) infrastructure, the selection and development of a virtual forum must be carefully vetted. Effective management and facilitation strategies for a virtual forum are not only highly desirable to afloat members but also recommended within VCoP literature. Recommendations for management and facilitation practices will be discussed here. Lastly, three of seven major findings (three, four, and seven) were related to a lack of trust within the afloat community. Strategies for enhancing communal trust within VCoP will be addressed.

Considerations for Selecting a Virtual Forum

Communication resources are critical to effective socialization within a COP (Kok et al., 2010; Su et al., 2012). These resources must, however, be selected from a systemic standpoint. As in, the tools that are selected for the community must suit the needs and preferences of its members and the organization they serve (Kok, 2010). Given the resource constraints and unique operational and scheduling demands placed upon the afloat community, taking a systemic approach to selecting tools is particularly important. Tools must be selected with members' preferences and lifecycle cost and sustainability considerations at the forefront. Participants in this study made several references to the use of a knowledge repository such as the USCG portal. The USCG portal offers the benefit of a centralized access point for publications, policy, and procedural guidance. Additionally, the portal can host asynchronous discussions, whereby members may post questions, comments, etc. Most significantly, the portal is already in use within the USCG, revealing its compatibility and usability within the organization.

When expressing preferences for virtual knowledge-sharing forums, participants referenced concerns regarding the capability of the USCG's IT infrastructure that were

compounded by underway connectivity challenges. The first major finding of this study was afloat members shared knowledge more frequently when stationed afloat vs. ashore. Ideally, therefore, afloat members need to have an IT infrastructure capable of supporting virtual knowledge-sharing while they are underway. Although not preferable, one survey respondent described the ability to work offline and then download material upon mooring. Determining the specific parameters and capability of a virtual forum was outside of the scope of this study, but understanding members' experience, interest, and comfort with virtual knowledge-sharing was the objective of research question three and essential to qualifying the community's potential engagement in a VCoP. Virtual forums must be selected with due consideration of organizational and asset specific virtual infrastructure limitations. Pursuing efficiencies within the USCG's current IT infrastructure should be considered, along with mechanisms for achieving compatibility with virtual capabilities on afloat units.

Effective Management and Facilitation Strategies

Participants' desires for management and facilitation of virtual knowledge-sharing forums were aligned with the literature on the importance and application of leadership strategies within virtual communities (Dubé et al., 2005; Parchoma, 2005). Participants referenced the need for a moderator or facilitator as part of a "system of care" for a potential VCoP. Responsibilities of this facilitator included establishing membership, participation, and discussion content parameters. Members did not refer to the facilitator as a leader, but this role entails a certain degree of oversight, control, and decision-making. Given the afloat community's challenges with trust and concerns regarding rank disparity, a more collaborative approach to facilitation is advisable. Team leadership

supplies the “collaborative power” (Parchoma, 2005, p. 467) necessary for VCOPs to achieve success. To mitigate rank disparity and challenges with trust, a team leadership approach requires VCOP leaders to cooperate effectively with team members and harness the “collaborative power” (Parchoma, 2005, p. 467) of the group. Team leadership may offer a viable approach and alternative to rank based leadership through which afloat members can understand and tackle issues through a group lens, rather than through individual efforts.

Successful managerial strategies for the afloat community’s VCoP should take into consideration the challenges posed by a lack of face-to-face interaction. Participants expressed an appreciation for interpersonal engagement when describing preferences for face-to-face learning. Tarmizi, Gert-Jan, and Zigurs (2007) contended that leadership demands in virtual communities of practice are greater than other organizational constructs because the traditional means of interaction, such as face-to-face meetings and interaction are absent. Managing and promulgating membership requirements for this group may enhance transparency and enable members to feel more connected despite virtual limitations. Membership management was specifically referenced by two interviewees who desired a greater degree of control over discussion content and rule of engagement. Although membership management may enhance transparency and awareness, the extent of managerial control should not be overly restrictive, potentially limiting communal engagement. A collaborative, team approach to leadership may prevent unnecessary obstruction and enhance knowledge-exchange (Dube et al., 2005).

Strategies for Enhancing Communal Trust

To enhance trust and encourage knowledge-sharing, virtual communication may be augmented with face-to-face community meetings (Ardichvili et al, 2003; Usoro et al., 2007). Face-to-face meetings allow for members to get to know one another on a more personal basis and may have a positive impact on socialization (Cowan, 2012). Given afloat members' challenging operational schedules and geographic segregation, face-to-face meetings may not always be possible. Given participants' appreciation for interpersonal engagement, however, the option for these meetings may be greatly appreciated.

Face-to-face meetings also enhance communal and organizational perceptions of legitimacy. Members are able to associate a more concrete and tangible relationship within the VCoP and the meeting demonstrates a certain degree of organizational commitment and support. Promoting organizational engagement in a potential VCoP may enhance its legitimacy and promote knowledge sharing and exchange between members (Rogers, 2000; Wenger, 1998a). Face-to-face meetings may provide an opportunity for the VCoP to establish an identity within the USCG. Additionally, these meetings may provide members with a greater sense of familiarity and comfort in advance of virtual engagement with other members of the community.

Based on the results of the pilot study and the researcher's experience, anonymity was seen as a mechanism for enhancing communal trust at the onset of this research. Given the diversity of opinion and concerns regarding personal accountability and information control, anonymous knowledge-sharing should not be pursued without additional analysis and insight into implementation options. Of the thirty percent of

members who considered anonymity a positive influence in their willingness to share knowledge, ten percent referenced the desire for optional anonymity, whereby members could add their name to a posting if desired. Additional afloat members' opinions and perceptions of anonymity should be discussed and disseminated collaboratively prior to implementing anonymous knowledge-sharing.

Limitations of the Study

This study is subject to limitations involving generalizability, participant bias, VCoP scope, and the researcher's experience. As with most qualitative case study research, the generalizability of this study is limited due to the smaller population and the depth of detail being explored. The majority of participants in this study were members of the Surface Navy Association (SNA). Given their membership in an organization dedicated to learning and professional development of the afloat community, these members may favor the potential for knowledge-sharing and engagement afforded by VCoP more than members of the afloat community who do not belong to SNA. More specifically, the majority of survey participants were conveniently sampled from the SNA's email distribution lists. Although convenience sampling expedited access to the afloat community for this case study, this technique is subject to limitations regarding participant bias and credibility (Creswell, 2013).

SNA members who participated in this study may have a bias towards virtual knowledge sharing, as evidenced by their participation and membership within the SNA's email distribution list or expressed interest within this study. Their experience with virtual learning, along with their comfort and interest in engaging in virtual knowledge-exchange may be greater than portions of the afloat community not represented within

this study. Additionally, given the researcher's membership within the afloat community and the relatively small population of both the USCG and the afloat community, participants' responses may have been biased by their familiarity with the researcher. The researcher, along with ten of twelve interviewees, were stationed at USCG Headquarters in Washington, DC, at the time of this study. Thus, there is always the potential that their responses may have been more or less contrived than they would have been with a communal outsider.

Additionally, only two participants in this study were enlisted members and the other forty-nine were officers. One enlisted member responded to the survey and one enlisted member was solicited to participate in an interview due to his extensive time in service. SNA leadership did caution that their enlisted membership was traditionally low for unknown reasons, but the geographic, generational, and experience diversity afforded by SNA membership was a great benefit to this study. Enlisted representation within the participant pool should be pursued in future research on VCoP in the afloat community.

This case study was intended to qualify the afloat community's potential engagement in a virtual community of practice. As with any study assessing potential versus reality, efficacy is limited by an inability to measure the current state of performance and engagement. This study provided data critical to promoting and sustaining virtual knowledge-exchange in a community whose knowledge-sharing culture was not previously studied. The scope of participants and perspectives is, therefore, limited and will benefit from additional research in virtual knowledge-sharing. This study is also limited by the perspective of the researcher who is a member of the afloat community currently serving as a performance support and training analyst in the USCG.

The researcher has a bias towards the need for continuous improvement and evidence-based practice which may be achieved through the afloat community's engagement in a VCoP.

Recommendations for Further Research

In response to the limitations described above, additional research on the knowledge-sharing culture of the afloat community should be conducted to capture the opinions of enlisted members and females whose perspectives were limited in this study. Future research would also benefit from a more balanced presentation of platform-specific expertise, referring to knowledge related to a particular type of ship or afloat mission. A larger and more diverse pool of afloat members purposefully sampled to represent diverse shipboard and mission experience, such as law enforcement, ice-breaking, aids to navigation, and inland construction and navigational platforms, may provide a more balanced perspective on willingness to share knowledge, perceptions of trust and reciprocity, and disposition towards online learning.

Given the diversity of opinion surrounding the potential implementation and benefits of anonymous knowledge-sharing, additional research is recommended to determine the most culturally acceptable and mutually beneficial mechanism to promote knowledge-sharing while preserving trust and service reputation within a VCoP. Participants' opinions against anonymous knowledge-sharing reveal a keen sense of accountability and regard for professional competence within the afloat community. Communal trust is positively impacted by these shared perceptions of capability, expertise, and benevolence (Lin et al., 2009). Opinions in favor of anonymous knowledge sharing, however, reflect concerns regarding vulnerability and judgment. Additional

research is advisable to qualify communal trust within the afloat community and fully understand learners' needs and dispositions prior to implementing anonymity in virtual knowledge exchange. Future research on the presence and influence of trust within the afloat community may enhance organizational climate and promote the development of associated performance support and training mechanisms.

This study included a case coding analysis of demographic categories including gender, years of service, and years of sea time. This analysis revealed that over one third of members with fifteen years or more total time in service were not comfortable with sharing knowledge virtually. This demographic is significant because it includes mid-grade to senior level leadership within the USCG. Understanding this perspective and analyzing organizational trends related to virtual knowledge exchange is critical to the USCG's successful adaptation of technology in the future. A longitudinal study, whereby afloat members' perceptions of virtual knowledge-sharing are analyzed during initial, mid-grade, and senior points throughout their career may yield valuable insight into the development and evolution of one's virtual learning dispositions over time.

Conclusion

The findings from this study suggest that the afloat community possesses potential for successful engagement in a VCoP. Members share knowledge frequently within the community and possess experience, interest, and comfort with virtual learning. Most significantly, members' participation and knowledge-exchange are guided by the altruistic desire to help others rather than the need or desire for knowledge reciprocity. Members' knowledge-exchanges are not dependent upon receiving knowledge in return. Rather, afloat members are willing to share information on mistakes and lessons learned

if this information will help others to avoid the same pitfall and preserve communal safety and wellness. The theoretical underpinnings of CoP, including legitimate peripheral participation and situated learning theory, are also aligned to the knowledge-sharing behaviors of the afloat community. Afloat members share knowledge more frequently when stationed afloat vs. ashore, revealing the desire for contextual learning and practice. Legitimate peripheral participation is also facilitated by the interplay between senior and junior afloat members. Senior participants admitted to more frequently imparting knowledge, whereas junior members were more likely to observe and participate in behavior and practices demonstrated by senior members.

The afloat community's potential for engagement in a VCoP is challenged by members' perceptions of trust and vulnerability with sharing information on mistakes and lessons learned. Some members feel that their service reputations may be placed at risk if they share information regarding an error or admit to a knowledge deficit regarding some element of afloat operations. Information on mistakes and lessons learned, however, is highly valued by the community. One survey respondent referred to lessons learned as the "lifeblood" of the afloat community. As an essential VCoP component and critical influence in fruitful knowledge exchange, understanding and enhancing communal trust is necessary for VCoP development and sustainment. This study outlined mechanisms for enhancing trust through face-to-face engagement and further analysis into members' perceptions of anonymous knowledge-sharing. VCoP affordances, including increased access to subject matter experts, flexibility, and rapid information exchange are particularly valuable to the afloat community in today's resource-constrained environment. This case study qualified the afloat community's VCoP potential and

identified strategies for the development and sustainment of an innovative mechanism to support the USCG's ready, relevant, and responsive workforce.

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APPENDIX A

Informed Consent for Case Study

Study Title: U.S. Coast Guard Afloat Community's Potential for VCOP**Development****Principal Investigator:** Lisa

Rodman

Co-Investigator: Dr. Jesus

Trespacios

This consent form will give you the information you will need to understand why this research study is being done and why you are being invited to participate. It will also describe what you will need to do to participate as well as any known risks, inconveniences or discomforts that you may have while participating. Please ask questions at any time. If you decide to participate, you will be asked to sign this form and it will be a record of your agreement to participate. You will be given a copy of this form to keep.

➤ PURPOSE AND BACKGROUND

You are invited to participate in a research study to learn more about how members of the United States Coast Guard's (USCG) afloat community share knowledge and engage in professional development. The information gathered will be used to better understand whether the USCG's afloat community is a good candidate for the development of a Virtual Community of Practice (VCOP). VCOP refer to professional communities in which members are geographically dispersed and communicate primarily through virtual means. You are asked to participate because you have served in the USCG's afloat community.

➤ **PROCEDURES**

If you agree to be in the study, you will be asked to participate in one 30-minute interview. During the interview, you will be asked about your opinions on trust, knowledge-sharing, and online learning in the afloat community. The researcher will take notes and use a voice recorder to record your responses.

➤ **RISKS**

This study involves no serious foreseeable risks.

➤ **BENEFITS**

There will be no direct benefit to you from participating in this study. However, the information that you provide may help inform professional development opportunities for the USCG's afloat community in the future.

➤ **EXTENT OF CONFIDENTIALITY**

Reasonable efforts will be made to keep the personal information in your research record private and confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law. The members of the research team and the Boise State University Office of Research Compliance (ORC) may access the data. The ORC monitors research studies to protect the rights and welfare of research participants.

APPENDIX B

Interview Script for Pilot Study

**Project Title: U.S. Coast Guard Afloat Community's Potential for VCOP
Development**

Investigator will collect consent forms.

Interview Script

Thank you for agreeing to speak with me today. The purpose of this interview is to get your feedback on knowledge-sharing practices within the U.S. Coast Guard's afloat community. I am exploring whether the U.S. Coast Guard's afloat community would be a candidate for participation in a Virtual Community of Practice (VCOP). VCOP refer to professional communities in which members are geographically dispersed and communicate primarily through virtual means. VCOP offer a flexible and potentially cost-effective mechanism for professional development that may be well-suited to the unique operational demands of afloat members.

Research reveals that trust, knowledge-sharing, and disposition towards online learning are key predictors of successful VCOP. Afloat members, like you, have a far greater understanding of how the community views trust, knowledge-sharing, and online learning. I want to know your opinions on these predictors of VCOP success to make a determination on whether the afloat community could benefit from professional development opportunities afforded through VCOP.

1. How many years of service in the U.S. Coast Guard (USCG) do you have?

How many years of sea time have you served in the USCG?

2. Do you believe that members of the afloat community share knowledge frequently with other members of the afloat community?
 - a. If so, how does this knowledge sharing occur?
 - b. If not, why do you think that knowledge is not shared between members of the afloat community?

3. Are you comfortable sharing mistakes and lessons learned with other members of the afloat community?
 - a. If not, why?

4. Do you trust other members of the afloat community will respect knowledge shared regarding mistakes or lessons learned?
 - a. If not, why?

5. Do you perceive a need for additional professional development opportunities for the afloat community?

6. Are you comfortable sharing knowledge in a virtual forum (blog post, online classroom, etc.)?
 - a. Do you perceive that other members of the afloat community are comfortable sharing knowledge in a virtual forum?
 - b. If not, why?

APPENDIX C

Interview Script for Case Study

1. How many years of service in the U.S. Coast Guard (USCG) do you have?

How many years of sea time have you served in the USCG?

2. Do you share knowledge frequently with other members of the afloat community?

a. How?

b. Do you share knowledge with the afloat community more frequently when stationed afloat vs. ashore?

3. Do afloat members reciprocate the knowledge that you share with them? If so, is reciprocation of knowledge important to you?

4. Are you comfortable sharing mistakes and lessons learned with other members of the afloat community?

a. If not, why?

5. Do you trust other members of the afloat community will respect knowledge shared regarding mistakes or lessons learned?

a. If not, why?

6. Are you comfortable sharing knowledge in a virtual forum (blog post, online classroom, etc.)?

a. Do you perceive that other members of the afloat community are comfortable sharing knowledge in a virtual forum?

b. If not, why?

APPENDIX D

Open-ended Survey for Case Study

Q1 Greetings, Esteemed Cuttermen! The information gathered in this anonymous survey will be used to better understand the knowledge-sharing culture of the U.S. Coast Guard's afloat community and how this culture may be suited for potential engagement in a Virtual Community of Practice (VCoP). VCoP refer to professional communities in which members are geographically dispersed and communicate primarily through virtual means. Public and private sector organizations have successfully employed VCoP to enhance knowledge management and extend access to professional development and mentoring opportunities.

Unfortunately, not all VCoP are successful. Research reveals that trust, knowledge reciprocity, and disposition towards virtual learning are strong influences in the development and sustainment of VCoP. This study seeks to understand these knowledge-

sharing influences in the U.S. Coast Guard's afloat community as described by its members. Your time and expertise are truly appreciated!

Q2 Are you an officer or enlisted member?

- Officer (1)
- Enlisted Member (2)

Q3 What is your gender?

- Male (1)
- Female (2)

Q4 How many years of service do you have in the U.S. Coast Guard?

- < 5 years (1)
- 5-10 years (2)
- 10-15 years (3)
- 15-20 years (4)
- > 20 years (5)

Q5 How many years of sea time do you have in the U.S. Coast Guard?

- < 2 years (1)
- 2-4 years (2)
- 4-6 years (3)

- 6-8 years (4)
- 8-10 years (5)
- > 10 years (6)

Q6 Describe how knowledge-sharing most frequently occurs in the U.S. Coast Guard's afloat community (over email, on the phone, in social settings, during classroom training, etc.).

Q7 Describe how often you share knowledge with other members of the U.S. Coast Guard's afloat community.

Q8 Describe how often you reciprocate the knowledge that afloat members share with you.

Q9 Describe how often other afloat members reciprocate the knowledge that you share with them.

Q10 Describe your comfort level with sharing mistakes or lessons learned with other members of the afloat community.

Q11 Describe how you perceive other afloat members' comfort levels with sharing mistakes or lessons learned within the afloat community.

Q12 Describe your experience with sharing knowledge in a virtual forum (blog post, online classroom, etc.).

Q13 Describe your comfort level with sharing knowledge in a virtual forum (blog post, online classroom, etc.).

Q14 Describe how you perceive the afloat community's comfort level with sharing knowledge in a virtual forum (blog post, online classroom, etc.).

Q15 Describe your interest in sharing knowledge with other members of the afloat community in a virtual forum (blog post, online classroom, etc.).

Q16 How would the option for anonymous knowledge-sharing influence your willingness to share mistakes or lessons-learned in a virtual forum?

APPENDIX E

Recruitment Script for Voluntary Participation in Research Interviews

**Project Title: Knowledge-sharing and Virtual Community of Practice
Potential in the USCG's Afloat Community: A Qualitative Case Study**

Email Script:

Greetings, Sir/Ma'am,

Based on your membership in the U.S. Coast Guard's Afloat Community, you are invited to participate in a voluntary research study to learn more about how members of the United States Coast Guard's (USCG) afloat community share knowledge and engage in professional development.

Lisa Rodman, a graduate student at Boise State University, is conducting research to better understand the USCG afloat community's knowledge-sharing practices and potential for engagement in a Virtual Community of Practice (VCOP). VCOP refers to a learning community in which members engage primarily in virtual forms of communication to share knowledge and engage in professional development.

Your participation in this study is completely voluntary and all information provided will be kept anonymous. If you are interested in participating in a 30 minute

interview or have any questions regarding this research project, please contact Lisa Rodman:

Lisa Rodman

(732) 598 4013

lisarodman@u.boisestate.edu

Thank you for your consideration!

Respectfully,

Lisa Rodman