KNOWLEDGE SHARING AND VIRTUAL COMMUNITY OF PRACTICE POTENTIAL IN THE U.S. COAST GUARD'S AFLOAT COMMUNITY
A Qualitative Case Study

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Virtual communities of practice (VCoP) may provide the afloat community of the United States Coast Guard (USCG) greater opportunities for learning and professional development. The specific learning needs and constraints of this community, including geographic separation and dynamic deployment schedules, appear well aligned with VCoP structure and objectives. However, it is critical that the knowledge-sharing culture of the USCG's afloat community be thoroughly explored to ensure a systemic approach to the development and implementation of performance and learning interventions. Expanding upon the results of a pilot study conducted in 2017, this qualitative case study employed a survey and semistructured interviews to examine the afloat community's potential for successful engagement in a VCoP. Recommendations for enhancing trust and promoting communal development and sustainment are also discussed.

INTRODUCTION

Communities of practice (CoP) offer collaborative learning environments to facilitate the pursuit of educational, occupational, or organizational objectives. 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 (Lave &

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Wenger, 1991; Wenger et al., 2002), but formal membership is not required for successful interaction. 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 interorganizational transactions. In addition, virtual CoPs (VCoP) are developing and current research can be found across dispersed organizations with team membership across geographical distances. For instance, VCoP can be found in health sciences (Lara et al., 2016; McLoughlin et al., 2018) and the health industry (Pan et al., 2015). However, despite these successes, VCoP have not thrived in all situations and it is important to recognize the barriers that organizations may face implementing VCoP. This question of "fit" suggests that before trying to develop a VCoP, one should investigate the potential an organization or members of an organization have for knowledge sharing, a key aspect for a CoP.

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. 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 1 to 2 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, drills, and exercises (USCG, 2013b). On-the-job-training 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 qualifications. More senior members of the crew, specifically the commanding and executive (second in charge) officers, are provided with a brief familiarization cruise prior to reporting to their ship. The question is whether a VCoP may provide a versatile, accessible mechanism for afloat members to learn and engage in professional development. Therefore, an exploration is required as to how the knowledge-sharing culture of the afloat community may be suited for potential VCoP engagement.

LITERATURE REVIEW

Influences of Knowledge Sharing in CoP

Effective knowledge sharing entails the exchange of information between two or more learners and is critical to the development and

sustainment of a CoP (Ku & Fan, 2009; Lin et al., 2009). 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 should be fostered in order to maintain the flow of information between members: the desire to share knowledge and willingness to use the CoP as a source of knowledge (Ardichvili et al., 2003). 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).

VCoP Influences, Challenges, and Support Mechanisms

The relationship between trust and knowledge sharing is just as significant in a virtual community as in a traditional face-to-face environment. However, research suggests that VCoP face additional challenges. For instance, in the absence of face-to-face communication, members of a VCoP 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. 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 et al., 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). 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. Grouping efforts promote 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.

Barab et al. (2004) applied critical elements of activity theory to their online community. Specifically, Barab et al. (2004) took a systemic approach to this 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 multidimensional 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 of the potential and parameters of the online system. In an effort to promote sociability in a VCoP, Barab et al. (2001) incorporated collaborative online structures, developed "more visible" (p. 83) online discussions and interaction mechanisms, and established goals for communal engagement. 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).

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 underutilized 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 should also be considered when assessing their potential for engagement in a VCoP. Since VCoP require members to engage virtually, they should be both skilled and amenable to communicating within virtual forums. Wang and Haggerty (2009) considered virtual competence and self-efficacy as necessary components of virtual and social engagement. Virtual competence refers to a member's ability to use technology in diverse forums, whereas self-efficacy involves a member's confidence with virtual communication (Wang & Haggerty, 2009). Members who are able to use virtual forums more frequently and effectively may increase their interactions and build relationships within the forum. Member's virtual ability or preferences, however, should not be assumed. Proactive research and analysis should be conducted to assess these preferences and ensure their alignment with available virtual infrastructure (Dube et al., 2005).

METHOD

The purpose of this study was to explore the USCG's afloat community's potential for knowledge sharing and engaging in a VCoP. The following research questions guided this study:

1. How do members of the afloat community describe their willingness to share knowledge?
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?
3. How do members of the afloat community describe their experience, interest, and comfort with learning in a virtual environment?

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 to capture emergent data (Creswell, 2013, 2014; Yin, 2014). Additionally, a single case study method is recommended when accessing a case not previously explored through empirical research (Creswell, 2013, 2014; Yin, 2014).

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 (Rodman & Trespalacios, 2018). The pilot study informed the development of an open-ended survey. For the pilot, six members (4 males, 2 females) of the afloat community with varying degrees of time in service and afloat time took part in semistructured interviews used to investigate members' willingness to share knowledge, perceptions of trust and knowledge reciprocity in the afloat community, and disposition toward virtual learning. The interviews were recorded, transcribed, and then coded using a constant-comparative approach (Boeije, 2002; Glaser & Strauss, 1967; Lincoln & Guba, 1985).

By comparing different participant responses and emergent themes, a rich description of participants' perceptions of knowledge-sharing, trust, and disposition toward virtual learning was established. Themes were compared to the first author's experience as a member of the afloat community 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. 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.

Context of the 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, on-the-job-training 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. Thus, this study concentrated on the afloat community's potential engagement in a VCoP.

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. A link to an anonymous online survey was emailed to 180 afloat members. Survey respondents were conveniently sampled from email distribution lists including members of the Surface Navy Association (SNA). 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. 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 12 participants (4 female and 8 male) who represent diverse portions of the population were solicited for interviews (Creswell, 2013; Merriam, 2009).

Data Collection

Data was collected in two different phases for this study.

Phase 1: Open-Ended Surveys

An open-ended survey was the primary source of data collection for this study. Open-ended survey questions offer the benefit of producing detailed information to support research (Creswell, 2014). The survey questions were created based on the pilot study and to align to the research questions guiding this study. The following are a few examples of questions from the survey:

- 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.).
- Describe how you perceive other afloat members' comfort levels with sharing mistakes or lessons learned within the afloat community.
- Describe how you perceive the afloat community's comfort level with sharing knowledge in a virtual forum.
- Describe your interest in sharing knowledge with other members of the afloat community in a virtual forum.

Respondents included 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. Thirty-nine of the original 47 responses were deemed complete, yielding a response rate of 26%.

Phase Two: Interviews

The second phase of data collection consisted of semistructured interviews of a purposefully sampled group of the afloat community. 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 a variety of perspectives on a particular case (Stake, 1995). One-on-one interviews of 12 members of the afloat community were conducted to detail the community's perceptions of trust, knowledge reciprocity, and disposition toward online learning.

Data Analysis

The open-ended surveys and interviews were analyzed using the constant-comparative approach (Boeije, 2002; Glaser & Strauss,

1967; Lincoln & Guba, 1985). 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). The use of interviews and surveys provided varied methods and sources of data for comparison and accuracy. Throughout the interviews, the interviewer paraphrased participants' statements and opinions, providing participants the opportunity to assess paraphrased interpretations for accuracy.

RESULTS AND DISCUSSION

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 toward learning in a virtual environment. Each of these findings will be applied to answer the three research questions in the study.

Research Question 1: Afloat Members' Willingness to Share Knowledge

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 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 social cognitive theory, 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 versus ashore. Over 30% 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 is it 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 was that altruism and the desire to help others enhances 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 38% 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 do not provide information to others with the expectation of getting information back. This statement runs counter to the norm of reciprocity. Grounded in social exchange theory, 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 et al., 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, [et cetera]. 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 supported the notion that afloat members are willing to share knowledge with other members to benefit the greater good. These findings also corroborated 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 the first author's own experience and research regarding knowledge-sharing influences within the public sector. In public sector organizations geared toward 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' Abilities to Trust Other Members With Information Regarding Mistakes or Lessons Learned

Altruism was the most prominent, positive influence on members' decision to share information on mistakes or lessons learned. Over 30% of respondents, including 50% 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 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 18% 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 antimistake, competitive mentality. Three interviewees distinguished between sharing a mistake versus a lesson learned, explaining the community was more forgiving if an error was couched as a "lessons learned" versus 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 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 toward 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 related to altruism and the desired to help others 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, how-

ever, 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 10% 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 first author'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' Experiences, Interests, and Comforts With Virtual Learning

Experience With Virtual Learning

The fifth major finding 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. 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 54% 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 25% 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 com-

munication. 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 86% of participants were interested in sharing knowledge virtually and 71% 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 15 years of service, only 11% 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, 2000). 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 60% 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 30% 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 50% 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.

Eighty-eight percent of afloat members possess experience sharing knowledge in a virtual forum and appreciate the efficiencies afforded by virtual knowledge exchange. Although 86% 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 67% 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. Finally, three of seven major findings (three, four, and seven) were related to a lack of trust within the afloat community.

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 life cycle 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 versus 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 (Bourhis 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 decisionmaking. 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 et al. (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 rules 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 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 first author'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 30% of members who considered anonymity a positive influence in their willingness to share knowledge, 10% 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.

CONCLUSIONS

The findings from this study suggest that the afloat community possesses the 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 versus 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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