

## Identifying factors that encourage and hinder knowledge sharing in a longstanding online community of practice

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### *Abstract*

*Despite the strong interests among practitioners, there is a knowledge gap with regard to online communities of practice. This study examines knowledge sharing among critical-care and advanced-practice nurses, who are engaged in a longstanding online community of practice. Data were collected about members' online knowledge contribution as well as motivations for sharing or not sharing knowledge with others. In sum, 27 interviews with members and content analysis of approximately 400 messages were conducted. Data analysis showed that the most common types of knowledge shared were "Institutional Practice" and "Personal Opinion". Five factors were found that helped motivate knowledge sharing: (a) self-selection type of membership, (b) desire to improve the nursing profession, (c) reciprocity, (d) a non-competitive environment, and (e) the role of the listserv moderator. Regarding barriers for knowledge sharing, four were found: (a) no new or additional knowledge to add, (b) unfamiliarity with subject, (c) lack of time, and (d) technology. These results will be informative to researchers and practitioners of online communities of practice.*

### **Introduction**

In the past, knowledge sharing among professional practitioners has typically been discussed in the context of traditional learning approaches such as formal training workshops or seminars (e.g., see Loucks-Horsley, Hewson, Love, & Stiles, 1998, for teacher education). Such sharing of knowledge, however, has been criticized as being removed from the place where knowledge is to be applied (Brown & Duguid, 1996; Robey, Khoo, & Powers, 2000).

In contrast, informal knowledge sharing sessions (e.g., "just-in-time" learning), occur in the context of the professional practitioner's immediate curiosity, needs or desires (Granger, Morbey, Lotherington, Owston, & Wideman, 2002). This need-to-know approach can transform practitioners into active knowledge builders possessing substantial autonomy regarding the specific knowledge or skills required (Granger et al., 2002). One of the mechanisms to support informal knowledge sharing is through communities of practice. As Huysman and Wulf (2005) explain, "Their [i.e. communities of practice] greatest strength is that they facilitate informal sharing of knowledge among people" (p. 81).

Despite the strong interests among practitioners, there is a knowledge gap with regard to online communities of practice (Baek, 2002). The original concept of communities of practice addressed knowledge sharing that occurred in face-to-face situations such as apprenticeships of Mayan midwives in Mexico, work-learning settings of the United States Navy quartermasters, and among non-drinking alcoholics in Alcoholics Anonymous (Lave & Wenger, 1991). Since then, there have been studies of community of practice in settings such as technicians (Orr,

1996), claim processors (Wenger, 1990), defense lawyers (Hara, in press), telecommunication engineers (Yi, 2000), consultants (Chao, 2001; Haney, 2003), and teachers (Baek, 2002; Barab, MaKinster, & Scheckler, 2003). Although such studies have been valuable in providing us with greater insights into how knowledge sharing can occur within a community of practice, they nonetheless fall short in that most of the studies dealt with face-to-face environments. Little is known about online community of practice (Baek, 2002). Moreover, the study of communities of practice in nursing is scarce.

The following three research questions were addressed in this paper: (1) What types of knowledge did the nurses share with one another? (2) What are the factors that encourage knowledge sharing among the nurses? and (3) What are the barriers that hinder knowledge sharing?

*Theoretical framework:* To put the rest of the discussion in context, it is imperative that the term “community of practice” be addressed at the very onset, as well as how knowledge sharing can occur within the context of communities of practice.

*Communities of Practice:* Wenger, McDermott and Snyder (2002) define communities of practice as, “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (p. 4). There are four main characteristics that distinguish a community of practice (Wenger, 1998a): (a) practice, (b) community, (c) meaning, and (d) identity.

First, a community of practice is about professional activity or work practice, not a leisure time activity (Cox, 2005). A community of practice consists of individuals with a shared domain of expertise who voluntarily share knowledge about practices that matter to them (Gray, 2004). It is the practice or professional activity that differentiates a community of practice from other communities, such as a community of interest or leisure (e.g. baseball fan club). Second, knowledge sharing occurs in the context of a community. A community is referred to as a group of people who share a concern, or a set of problems about a particular topic (Wenger et al., 2002). In reviewing Wenger et al.’s (2002) definition, Cox (2005) concluded that the definition of a community is a group of people who are simply interested in the same thing (e.g., building a boat), and not necessarily closely tied together in accomplishing a common enterprise (e.g., building a boat together). Membership in a community typically implies a minimum level of knowledge of that domain—a shared competence that distinguishes members from other people (Wenger, 1998a). Finally, through sharing knowledge with one another, members explore the meaning of their practice, and develop a sense of professional identity (Gray, 2004).

Although all communities of practice have the four characteristics of (a) practice, (b) community, (c) meaning, and (d) identity, it is important to note they come in a variety of forms and shapes. Some are quite small; while some are large, often with a core group and many peripheral members. Some meet primarily face-to-face, while some meet mainly online. Some are within an organization and some include members from various organizations (Wenger et al., 2002).

More recently, Dubé, Bourhis, and Jacob (2003) provided a useful typology of 21 dimensions on which online communities of practice may differ and be compared. Dubé et al. (2003) called these dimensions, “structuring characteristics”, a term that refers to the rather stable elements that could be used to describe an online community of practice if one wants to take a snap-shot of it at one point in time. Bourhis, Dubé, and Jacob (2005) posit that although some of these structural characteristics, such as level of maturity, may evolve in time, the

majority of the characteristics are settled at the birthing stage and remain stable throughout the community's life.

These 21 structuring characteristics are divided into the following four categories: (a) demographics, (b) organizational context, (c) membership, and (d) technological environment. The first category, demographics, consists of the overall orientation, life span, age, and level of maturity. The second category consists of elements of the organizational context, and these include the creation process, the level of boundary crossing, the environment, the organizational slack, the degree of institutionalized formalism, and the structure of leadership. The third category focuses on membership, such as size, geographic dispersion, membership stability, members' enrollment and selection process, their prior community experience, level of technology literacy, cultural diversity and the topic's relevance to them. Finally, the last category, technological environment, includes the online community of practice's overall degree of reliance on technology and the variety of technology available to the community's members.

*Knowledge Sharing:* An important conduit for knowledge sharing among members in communities of practice is conversation (Sharratt & Usoro, 2003; Zeldin, 1998; Orr, 1996). In the case of an online community, the "conversation" associated with knowledge sharing typically involves the knowledge seeker posting an open question or a request for help to the community via a listserv or online forum. In response, a knowledge provider may either share his or her knowledge in the form of a story describing a similar experience where a method was used to solve a problem, or, if unable to provide an appropriate solution, share knowledge indirectly by referring the individual to someone else who might know and be willing to help.

Given that conversation is the typical conduit for knowledge sharing among members in communities of practice, the next logical question that needs to be addressed is: What then are the types of knowledge being shared? Traditionally, researchers have distinguished between tacit and explicit knowledge (Wensley, 2000). Tacit knowledge is the implicit, semiconscious and unconscious knowledge held in people's head (Leonard & Sensiper, 1998), while explicit knowledge is knowledge that is expressed (Biggam, 2001). Other scholars have resorted to other formulations. For example, Hildreth, Kimble, and Wright (2000) differentiate between "hard" and "soft" knowledge: "Hard knowledge is knowledge that can be easily articulated and captured. Soft knowledge on the other hand is not so easily articulated and cannot be so readily captured (p. 28)". Hara (in press) on the other hand, in her study of two communities of practice involving public defenders, described three broad types of knowledge: book knowledge, practical knowledge, and cultural knowledge. Book knowledge is mere facts, such as statutes, policies, standards, whereas practical knowledge refers to the use of book knowledge in practice; for example, how to use certain design standards or policies in Web development. Cultural knowledge is about what it is like to be an advance practice nurse, a web developer, or a literacy teacher and it includes *both* one's philosophy toward a practice, as well as one's professional responsibilities (including job description) in a practice. For example, cultural knowledge related to fire-fighting practice would entail the philosophy toward the practice (e.g. I want to save people's lives), and the professional responsibilities (including job description) associated with fire-fighting (e.g. connect hose lines to hydrants, operate a pump to send water to high pressure hoses, ventilate smoke-filled areas, and provide emergency medical attention to victims as needed).

In this study, Hara's conceptualization of knowledge types will be adopted, rather than the tacit-explicit knowledge dichotomy. This is because the tacit-explicit knowledge dichotomy does not give an understanding of what constitutes knowledge but merely illustrates that

knowledge can either be expressed or remain undeclared (Biggam, 2001). Keane and Mason (2006) further argue that the use of the explicit-tacit dichotomy to represent knowledge types is a misinterpretation of Polanyi's (1966) seminal work. They suggest that according to Polanyi's definition, tacitness is a dimension of knowledge, not a type; hence their statement that "all knowledge is composed of both tacit and explicit *dimensions* (not *types*)" (p. 1). The "hard" and "soft" knowledge dichotomy is not used because it is very similar to the explicit-tacit dichotomy; where "hard" corresponds to explicit and "soft" corresponds to tacit.

#### Method

A qualitative case study involving the constant-comparative approach (Lincoln & Guba, 1985) was adopted in this study. This approach is suitable given that the key purpose of this study is to help us gain an understanding of a situation (Merriam, 2001) – knowledge sharing among nurses in an online listserv, rather than to generate grand predictions or prove or disprove underlying hypotheses.

*Brief description of the case:* The Nurse Practitioners (a pseudonym) is an e-mail based listserv. It is one of the oldest and largest of its kind in the United States. Founded in 1993, as of February 2006, it had more than 1,310 members from all parts of the country. The Nurse Practitioners listserv (hereafter called NP-1) originally began as a MS-DOS-based listserv at a research university with approximately 100 members before moving to the *Yahoo! Group software* platform in February 2001. Membership growth was about 10 nurses per week when it was first founded, according to the moderator. The listserv affords a venue for clinical nurse specialists, nurse practitioners, educators, administrators, physicians, and other professionals interested in advanced practice nursing acute and critical care to meet at any time or place to network with one another. Members post queries by sending an email to a NP-1 address. The moderator screens membership applications to the listserv, as well as messages to reduce the number of advertising and other inappropriate postings. No attachments are allowed in the messages in order to prevent the spread of viruses.

All new members to the NP-1 are informed of netiquette to help facilitate good communications among members. The rules include: (a) post messages that are germane to advanced and critical care nursing practice only, (b) when replying to a message, do not include the entire message to which you are responding. If necessary, include part of the original message, (c) use a "signature" at the end of your message with your name, address, affiliation, and telephone or fax number, (d) avoid offensive language, (e) keep messages short and to the point, (f) patients should not be identified, and (g) the "Subject" title should accurately reflect the content of the message.

When viewed through Dubé et al.'s (2003) framework, NP-1 has the following 11 structuring characteristics: It (1) has a permanent life span with no definite time frame in mind as an on-going mechanism for knowledge sharing, (2) has been in existence for more than eight years, (3) is established by a number of interested members (bottom-up approach) rather than imposed by a certain management (top-down approach), (4) has a high level of boundary crossing because it involves members of different organizations, (5) has more than 1000 members, (6) involves members scattered around the world (i.e., having a high level of geographic dispersion), (7) has voluntary rather than compulsory membership enrollment, (8) is culturally diverse because members have various educational backgrounds, and come from disparate organizations, (9) is launched with a definite objective and theme in mind close to members' day to day occupations, (10) uses information and communication technology most of

the time for members' interactions (high degree of reliance on technology), and (11) is moderated. Table 1 summarizes these structuring characteristics.

Table 1. Structuring characteristics of NP-1

Dimensions		Site NP-1
Demographics	Life span	Permanent
	Age	1993
Context	Creation process	Spontaneous (i.e. by interested members)
	Boundary crossing	High
Membership	Size	Large (>1000)
	Geographic dispersion	High
	Enrollment	Voluntary
	Diversity	High
Technological environment	Degree of reliance on technology	High (utilizes one type of technology – listserv)
Moderation	Moderated or non-moderated	Moderated

*Participants:* Twenty seven nurses (one male, 26 female) who are members of the NP-1 participated in the study. Fourteen had more than 20 years of nursing experience; four had between 15 and 19 years; three had 13 to 14 years; while six had less than 10 years. The collective experience base included pediatric care, trauma, general medicine, cardiology, oncology, adult critical care and surgical critical care. All participants had a graduate degree, with three having doctoral degrees. A majority of the participants (n=22) had participated for five or less years in NP-1 (see Table 2 for the participant profiles).

Table 2. Characteristics of the 27 participants in NP-1

Participant	Gender	Years of experience	Years in NP-1	Highest education	Areas of specialty
Nurse A	F	25	10	Master	Pediatric care
Nurse B	F	25	8	Master	Pediatric care
Nurse C	F	8	1	Master	Trauma, general medicine
Nurse D	F	25	2	Master	Patient safety
Nurse E	F	25	4	Post-master	Cardiology
Nurse F	F	21	1.5	Master	Adult surgical
Nurse G	F	29	5	Master	Cardiology
Nurse H	F	25	9 months	Master	General ICU
Nurse I	M	16	3	Master	Surgical critical care
Nurse J	F	17	7	Master	Medical critical care
Nurse K	F	18	4	Master	Adult critical care
Nurse L	F	9	3	Master	Acute care
Nurse M	F	27	4	Master	Oncology
Nurse N	F	8	2	Master	Surgical critical care
Nurse O	F	14	2	Bachelor	Critical care
Nurse P	F	7	1.5	Master	Cardiology critical care
Nurse Q	F	21	1.5	Master	Trauma

Nurse R	F	13	1.5	Master	Cardiac surgery
Nurse S	F	23	10	Doctorate	Adult critical care
Nurse T	F	2.5	1.5	Doctorate	Critical care
Nurse U	F	14	3	Master	Cardiovascular critical care
Nurse V	F	27	1	Master	Nursing education
Nurse W	F	23	2 months	Master	Neurology
Nurse X	F	8	2	Master	Nursing education
Nurse Y	F	17	3	Master	Trauma, neural
Nurse Z	F	30	10	Doctorate	Critical care
Nurse AA	F	37	9	Master	Cardiovascular

*Data Collection Online observation:* The term “online observation” is extracted from the works of Mann and Stewart (2000), who argued that qualitative researchers can observe the linguistic behavior (both of what is said and how) of various kinds of computer-mediated communication usage, including both asynchronous and synchronous environments. As Mann and Stewart noted, “Clearly CMC [computer-mediated communication] offers an excellent site for qualitative researchers who observe discourse online” (p. 87). Online observation is deemed necessary because the members of the online communities of practice are located in various locations throughout the country and the world; hence making direct face-to-face observations in their workplaces difficult.

*Interviews:* Interviews were chosen as one of the data collection methods because the nurses’ experience of starting with the online community of practice was now in the past, and also because their perceptions and opinions could not be observed. We used the semi-structured interview format, where the interviews were focused and guided by issues pertinent to the study’s research questions. Each interview, lasting about 30-40 minutes, was conducted over the telephone. Informed consents to audio record the interviews were obtained from the participants.

*Data analysis:* To examine the types of knowledge that were shared by the nurses, we used Hara’s framework of knowledge types: (a) book knowledge, (b) practical knowledge, and (c) cultural knowledge to analyze the online messages posted in NP-1 for the first two weeks in the months of March 2001 to 2006 (in total of 400 messages). No data earlier than the year 2001 were archived. We chose March 2001 because it was the month immediately succeeding the time that NP-1 migrated to the new *Yahoo! Group software* platform from an old dos-based listserv. (We did not choose February 2001 itself because NP-1 just began operation with *Yahoo Group Software* in that month; we wanted to capture the daily communications among the members

rather than teething migration-related communications.) For consistent purposes, we subsequently chose the months of March 2002, 2003, 2004, 2005, and 2006. A period of two-week interval was chosen to keep the data corpus manageable for analysis.

Although we used Hara's knowledge framework a priori, we did not forcefully impose any of the coding categories onto our data corpus. During the course of our analysis, we also allowed for new knowledge categories (if any) to emerge inductively during the coding process. To increase the consistency of the classifications, we identified exemplary postings that clearly illustrated the different types of knowledge. These examples were then used as initial codes to guide the continuing analysis efforts, using the constant-comparison method until each type of knowledge category was saturated.

To understand the factors that encourage and hinder knowledge sharing among the nurses, we analyzed the nurses' interview data. The coding scheme in this case was not predetermined prior to our analysis but emerged through our interaction with the data. Again, to increase the consistency of the classifications, we identified exemplary postings that clearly illustrated the different types of factors. These were then used as templates to guide the continued analysis efforts via the constant-comparative method until each factor category was saturated.

*Potential threat to validity of study:* Since this is a study on online communities of practice, the most obvious potential threat to validity of the study is whether members of NP-1 really constitute a community of practice. The validity of this study will be strengthened if it can be first ascertained that NP-1 is indeed a community of practice.

Evidence that NP-1 is a community of practice can be seen by its ability to successfully fulfill all the four characteristics put forth by Wenger (1998a): (a) practice, (b) community, (c) meaning, and (d) identity. First, members of NP-1 have a common shared practice, a professional activity (i.e., nursing) that brings them together; and not a leisure time activity. Through this shared practice they develop a shared repertoire of resources, such as experiences, stories, tools, and ways of addressing ways to care for patients. Second, members of NP-1 engage in discussions and share knowledge with one another. The average number of messages posted in NP-1 every month from February 2005 through February 2006 was 200 or 40 messages each week. An analysis of these messages revealed that members in NP-1 primarily engaged in the activity of sharing knowledge with one another (more detail is provided in the Findings and Discussion section). Through such interactions (i.e. share knowledge), members in NP-1 form a community around their domain and build relationships with one another (Brown & Duguid, 2001; Hislop, 2004). Third and fourth, through their discussion with other nurses in NP-1, members may explore fundamentally important questions and meaning pertaining to the roles they play as critical care or advanced practice nurses; these roles, in turn, help formulate and validate their professional identities. As commented by one nurse: "I believe the listserv helps to formulate a sense of professional identity. There are questions about professional development discussing issues on nurses' roles and responsibilities. It gives me some validity about what a nurse's identity is when I talk to my director".

In summary, NP-1 functioned as an online community of practice. Participation in the listserv not only served as an avenue for interaction and knowledge sharing situated in the actual context of the nurses' everyday work experience (i.e. practice), but also helped to define identity of practicing nurses.



## Findings and Discussion

This section looks at the results and discusses their relevance in terms of the research questions raised earlier.

### *Research Question 1: What types of knowledge did the nurses share with one another?*

Content analysis of online messages (taken from the first two weeks of the months of March 2001, 2002, 2003, 2004, 2005, and 2006) revealed two types of knowledge were shared: book knowledge and practical knowledge. In order to determine the consistency of our knowledge type analysis, we had an independent coder randomly code approximately 30% of the data. The independent coder was not involved in the research study at all. The agreement coefficient of the coding was 0.93. The two types of knowledge shared were: (a) Book knowledge – facts, general regulations, statutes, or published works. For example: “The reference is the New England Journal of Medicine, 345(19)...” (b) Practical knowledge – book knowledge related to actual practice.

Practical knowledge can be further classified into one of the following three categories:

- (a) Personal opinion – individual opinion not necessary representing best practices. For example: “I believe that we should always assess for XXXX in every patient at every encounter.”
- (b) Personal suggestion – personal recommended solution to a problem or issue. For example: “You might want to talk to the people at the XXX in Washington, DC.”
- (c) Institutional practice – knowledge related to what an institution currently practices or has practiced in the past. For example: “In our setting, all of our patients receive daily x-rays. For our surgery patients, they have a pre-op x-ray, then daily x-rays...”

Analysis of the types of knowledge shared revealed that the most common was “Institutional Practice” (57.6%) (see Table 3). “Personal opinion” knowledge, made up the second most frequent types of knowledge shared; followed by “Personal Suggestion”. The relatively low count of “Book Knowledge” being shared among the nurses in listserv was not very surprising given the fact that many of the members are already very knowledgeable in their content areas (a majority of the nurses have advanced degrees in nursing – e.g. a master’s certification). In addition, it is worth noting that the typical types of book knowledge shared were the latest policies or regulations or evidence-based literature pertaining to nursing practice. Although “cultural knowledge” was not evident in the online messages, it should not be deemed as there was no or little recognition of this knowledge. “Cultural knowledge” was self-evident; each of the NP members being either a critical care or advanced practice nurse. In fact, as mentioned before, the entire NP-I is open only to individuals from such disciplines. Perhaps the self-evident nature of “cultural knowledge” eliminates the need for many explicit expressions of such knowledge in the communication among the nurses.

**Table 3. Types of knowledge and frequency**

Types of knowledge	Frequency	Percent
Book knowledge	12	6.4
Personal opinion	40	21.5
Personal suggestion	21	11.3
Institutional practice	113	60.8
Cultural knowledge	0	0.0

***Research Question 2: What are the factors that encourage knowledge sharing among the nurses?***

From our analysis of interview data, we identified the following five motivating factors that encourage knowledge sharing among the nurses: (a) self-selection, (b) desire to improve the nursing profession, (c) reciprocity, (d) a non-competitive environment afforded by the listserv, and (e) role of the moderator.

*Self-selection:* Membership in the NP-1 is self-selected. People in such communities tend to know when and if they should join; they know if they have something to give and whether they are likely to take something away (Wenger & Snyder, 2000). Because self-selection means that members choose to contribute to the community entirely of their own accord, members feel no sense of being pressured to share knowledge. As remarked by nurse H in an interview, “Contributing to the NP-1 community is a voluntary thing. People contribute because they themselves want to.” Knowledge sharing in the online community of practice thus proceeds informally and naturally.

*Desire to improve the nursing profession:* Another reason that encouraged members of NP-1 to share their knowledge is the desire to improve patient care – the primary purpose of the nursing profession. Members felt that they belonged to a larger social network of nurses even though they might not be working together in the same hospital; they shared their knowledge because they see the other nurses in NP-1 as similar minded people in the same nursing profession who have the same goal as them to improve patient care. For example, when asked why she shared knowledge, Nurse E answered:

“I share my knowledge because I feel a very strong sense of community on the listserv. The listserv is a community made up of people who are passionate about the nursing profession and want the best for the patients. So, if I can help someone in their particular situation to improve their patient care, I will do so by sharing what I know works well for me, as well as what doesn’t work well so that they don’t make the same mistake.”

*Reciprocity:* Members also indicated that they felt obligated, due to a sense of reciprocity, to help others by sharing what they know because they had received help at some point in the past from other members of NP-1. They felt that giving back to the listserv by sharing their own knowledge in return for help was a responsibility that they should fulfill. For example, Nurse R remarked: “I’ve been in the situation before; now I want to give back [by sharing my knowledge] what I’ve received in the past.” Nurse Y confirmed: “I want to help others because I’ve been helped before.” Reciprocity can also work the other way. Instead of people sharing

knowledge as a way to fulfill an obligation, some people share knowledge in the expectation of getting help in return. Soo (2006) refers this to as giving a down-payment for an expected later payback. For example, Nurse O stated: “I help others by sharing my knowledge in the expectation that they would help me in return.” Nurse Q, similarly stated: “If I share what I know, they’d be more likely to share their knowledge with me.”

*A non-competitive environment:* The very nature of the communication medium also plays an important role in supporting and sustaining the online community of practice. Many nurses, when interviewed, stated that the online environment helped members to be more willing to share knowledge. This was mainly due to the non-competitive environment afforded by the online communication medium that brings people from different organizations together. Traditionally, organizations have rewarded their employees based on their individual performance and know-how (Alavi & Leidner, 2001). In such situations, it is expected that individuals will attempt to build up and defend their own hegemonies of knowledge rather than share with others (Von Krogh, 1998). However, distant and informal contact between professionals from *different* organizations might be an important mechanism to overcome such a barrier (Robertson, Swan, & Newell, 1996). Our interview data supported this view by revealing that some nurses, who worked in different organizations, felt that they were able to share knowledge easier due to the non-competitive character of the distributed online environment simply because they were not in the same organization. Nurses felt that they did not have to hoard knowledge because there was no competition among them in terms of promotion or reward since many were working in different organizations. As remarked by nurse F:

“I actually get better communication from my peers on the listserv. People are more willing to share things, especially when they are not your peers who may have ulterior motives...trying to work their way up the organization. You know what...they [people in the listserv] are not likely to run into you, and so they [are more likely] to tell you an honest opinion.”

*Role of the listserv moderator:* Data from the interviews and online observations also indicate that the majority of members perceived the role of the moderator an important factor in encouraging knowledge sharing. First, by acting as a sieve or filter, the moderator helps keep communication focused on professional issues pertinent to critical care and advanced practice nursing fields. As remarked by Nurse B, “[The moderator] is very careful in taking care of the NP-1 discussion.” Nurse F added, “Personal issues unrelated to the listserv are kept out mainly by the effort of the moderator.” An interview with the moderator revealed that commonly rejected messages are those that seek to exploit NP-1 members (e.g., recruitment for some self-serving purposes); this does not include genuine job advertisements which can be useful for the NP-1 members.

Second, by acting as a “watchdog” of netiquette, the moderator helps keep communication civil. For example, the moderator explained that unprofessional statements (e.g., personal attack on a member) are frowned upon, and the she is quick to caution those responsible. Such incidents are, however, rare, happening only about once a year.

### ***Research Question 3: What are the barriers that hinder knowledge sharing?***

The current findings reveal that barriers of knowledge sharing in NP-1 did not have anything to do with selfish attempts to hoard knowledge which is often cited in the literature as a major barrier to knowledge sharing (Ardichvili, et al. 2003). Instead, from our data, we identified the following barriers: (a) no new or additional knowledge to add, (b) unfamiliarity with subject, (c) lack of time, and (d) technology.

*No new knowledge or additional knowledge to add:* Nurses were found to be careful that what they shared would “add value” to the discussion on hand. They only shared their knowledge if they thought that they had something novel to add which had not been previously brought up by other people in the discussion. This was clearly exemplified by Nurse K who stated:

“I don’t post if I feel that I’ve nothing new to add to the discussion. If somebody had already posted [shared] something that I’d have posted myself if I’ve seen it, I won’t post it unless I’ve something new to share. I don’t want to put anything forward if it’s just a repetition of what had been said.”

*Unfamiliarity with subject:* The nurses also indicated that they would not share anything which they were unfamiliar with. This lack of knowledge seemed to occur because such knowledge was out of the nurses’ areas of expertise or daily practice. Unfamiliarity with subject should not be confused with no new or additional knowledge to add. The latter refers to a knowledge sharer being familiar with a subject but did not share knowledge because he or she had nothing extra to say about an issue or subject under discussion. Unfamiliarity with subject, on the other hand, refers to individuals who had little or no knowledge to begin with about a certain issue of subject. As a result, they could not share something which they were unaware of. As remarked by Nurse E:

“I don’t share knowledge when the requests for help are not relevant to what I know or what I’m currently doing. For example, the requests for help may be about a topic that is totally different from my area of expertise, or that it is about a totally different organizational structure/policy than that of my own hospital; thus making it hard for me to contribute what I don’t know.”

*Lack of time:* As mentioned previously, membership in NP-1 is voluntary, and that NP-1 was not affiliated with any specific organization. As a result, sharing knowledge in NP-1 was not something that the nurses were expected to do – they were not paid by their organizations to share what they know in the listserv nor were they assessed by how well they performed in the listserv. The nurses shared their knowledge out of their own spare time; such spare time would therefore fluctuate depending on how busy the nurses were with their own work of caring for patients at their respective organizations. As noted by Nurse E: “Sometimes I’m simply too busy to be able to respond to someone.” This was seconded by Nurse I who stated: “Lack of time is a barrier to me. I’ve to handle many tasks in my job, hence there is little time left for me to go to the listserv to share.”

*Technology:* Another barrier that hinders knowledge sharing in NP-1 was due to the use of the technology itself. In the current listserv environment, the only way to share knowledge is

through an email text-based medium, and this may not be the best way to do so especially if the knowledge to be shared is a difficult one. Nurse R, for example, explained: “Sometimes I find it difficult to communicate some things clearly in words and I may run the risk of being misunderstood by someone else.” Similarly, Nurse Z commented: “Some issues or topics are very hard to be adequately represented in words.” This finding corroborates Cheung and Hew’s (2004), and Ganeva’s (1999) research who found that participants sometimes find it hard to express certain ideas clearly in words; and this put them off from contributing what they know.

## Conclusions

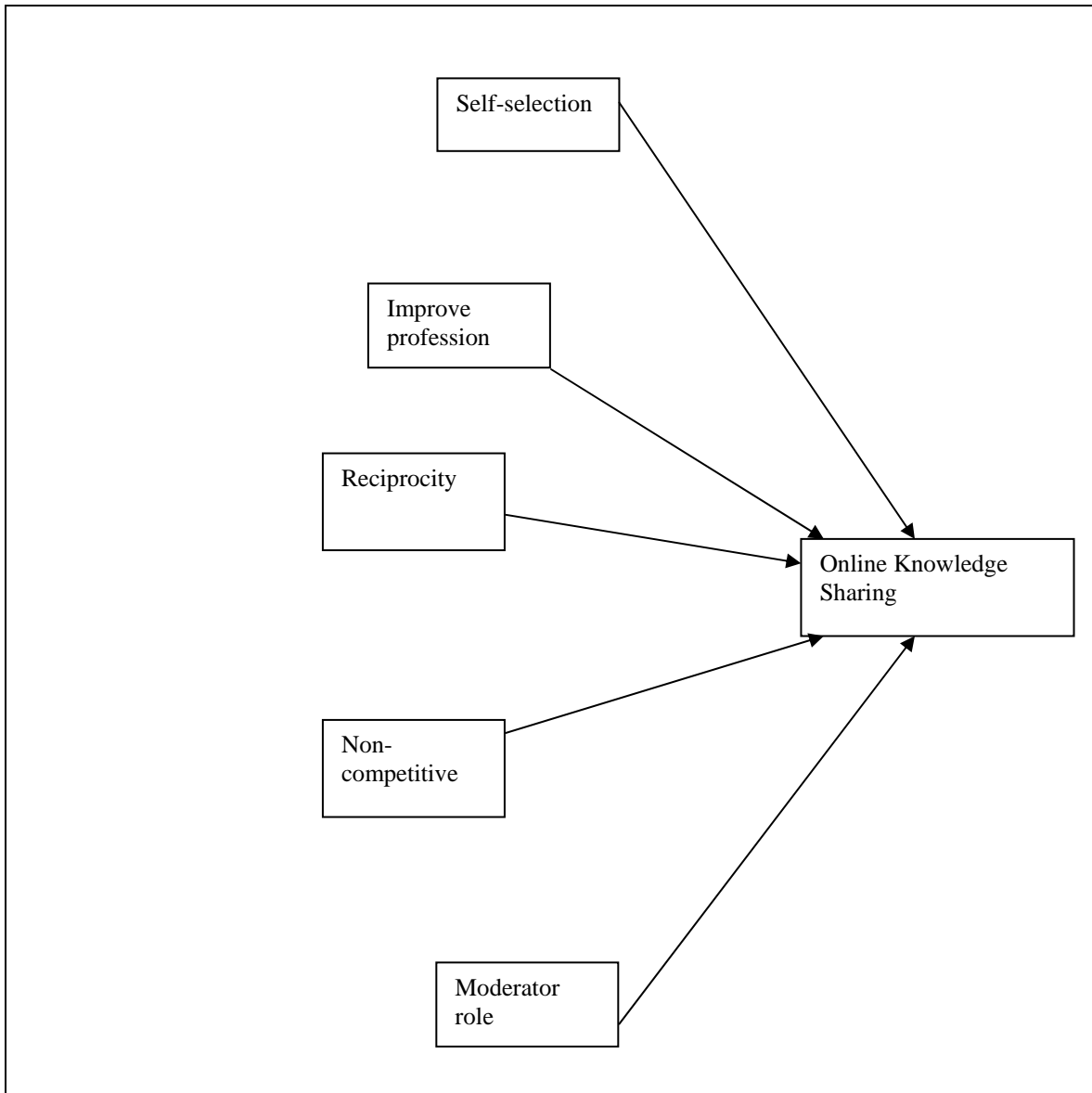
The findings in this study suggest that the NP online listserv environment, as a whole, did function as an online community of practice. The most common type of message posted was “Sharing knowledge”, followed by “Solicitation”. Regarding the types of knowledge shared, the most common ones were “Institutional Practice” and “Personal Opinion”. The factors that have helped motivate knowledge sharing within the online community of practice include: (a) self-selection, (b) desire to improve the nursing profession, (c) reciprocity, (d) a non-competitive environment afforded by the listserv, and (e) role of the moderator. Barriers that hinder knowledge sharing include: (a) no new or additional knowledge to add, (b) unfamiliarity with subject, (c) lack of time, and (d) technology.

Overall, this study has contributed to the body of knowledge regarding online communities of practice in three ways. First, it contributes to a greater understanding of the types of knowledge shared that characterize an online community of practice. Such a description may help other researchers comprehend the activities in which members of online communities of practice engage.

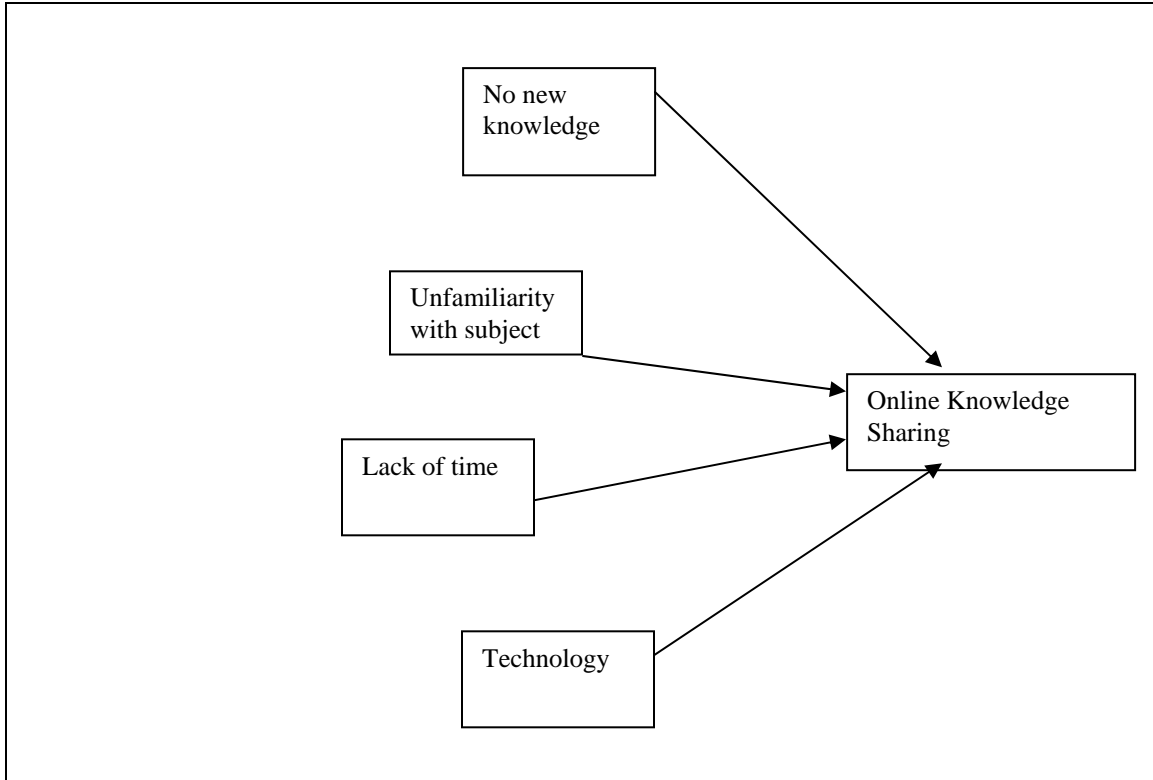
Second, this study focuses on online communities of practice that include individuals from different organizations. Few studies looked at online communities of practice that span more than one organization. Thus, the findings from this study will present a unique perspective on the motivation and barriers of individuals who come from various organizations to share their knowledge with one another.

Third, this study suggests the development of tentative theoretical models of motivators and barriers to share knowledge in an online community of practice. Figures 1 and 2 respectively illustrate the models for motivators and barriers derived from the findings of this study.

**Figure 1.** Theoretical model of motivators for knowledge sharing in an online community of practice



**Figure 2.** Theoretical model of barriers to knowledge sharing in an online community of practice



Future studies can take several different directions. First, further research should be conducted in other online communities of practice. The current study was conducted with nurse practitioners in advance and critical care fields that stress highly the need for members to be cognizant of current best practices and evidence from the literature—what Sackett, Straus, Richardson, Rosenberg, and Haynes (2000) refer to as evidence-based medicine. Future studies should consider online communities of practice that place less emphasis on such need. What types of messages would be generally posted by members of such communities? What about the types of knowledge shared by the members? Second, there is a need for future research to validate that our five motivating factors and barriers apply across various other disciplines. For example, one might investigate whether there are other important motivators and barriers that need to be considered. One might also investigate the ways in which the motivators, as well as barriers interrelate with each other. Third, future research might also consider the relative importance of each of the motivators and barriers within the *various stages* of an online community of practice life span. This is because a community of practice goes through a certain life span as living organisms do. Wenger (1998b) delineates five stages of development through which a community of practice moves. Which of the motivators and barriers are more critical and applicable during each development stage of an online community of practice's life span is an interesting question to explore.

In summary, the research findings presented in this paper will be informative to practitioners who are in a position to foster online communities of practice. Concurrently, this study addressed the research gap in the literature, namely, motivation for sharing knowledge in a longstanding online community of practice.



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