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Information Environment of a Military University Campus: An Exploratory Study

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Abstract

The Naval Postgraduate School (NPS) is a military university educating officers from the United States and 40 foreign countries. To investigate the NPS information environment a large study obtained data on the range of information needs and behaviors of NPS personnel. The specific aim of the study was to supply organizational units with qualitative data specific to their client base, enabling them to improve campus systems and information services. Facilitators from the NPS Organizational Support Division conducted eighteen (18) focus groups during Spring Quarter 1998. Transcribed focus group sessions were analyzed using NUDIST software to identify key issues and results emerging from the data set. Categories of participants' information needs were identified, including an analysis of key information issues across the NPS campus. Use of Internet resources, other trusted individuals, and electronic indexes and abstracts ranked high among information sources used by NPS personnel. A picture emerges of a campus information environment poorly understood by the academic community. The three groups (students, staff and faculty) articulated different concerns and look to different sources to satisfy their information needs. Participants' information seeking problems centered on: (1) housing, registration and scheduling, computing and the quality of information available on the campus computer network, (2) an inability to easily disseminate information quickly to an appropriate campus audience, and (3) training in new information access technologies, and (4) the general lack of awareness of library resources and services. The paper discusses a method for more effectively disseminating information throughout the campus. Implications for the development of information seeking models and a model of the NPS information environment are discussed.

* To whom all correspondence should be addressed.

INTRODUCTION

According to Rainey (1997) "much theory and some expert observation hold that public organizations face greater complexity and more potential problems in group relations, communication, and conflict resolution. Little direct comparative evidence supports these observations, but the few studies that provide evidence about them tend to show greater complexity and problems." (p. 314). Universities are characterized not only by complexity as organizations, but also by accelerating change and "the transformational imperative of digital technologies." (Hawkins & Battin, 1998, p. 10). Johnson (1999) notes that "information seeking is often the first step in both individual and organizational change efforts, with heightened awareness of a problem often leading to increased readiness to change (p. 3). Taylor (1991) described the information use environment (IEU) as a context within which people live and work. Rosenbaum (1993) characterizes the relationship between an IEU and information behavior as each making the other possible. Katzer and Fletcher (1992) proposed a model of the information environment of managers that focuses on the actions of the individual manager within the context of the organizational setting and influenced by potential roles, activities, and dimensions.

In this study we examine the information use environment of the NPS as a unique academic institution educating approximately 1500 officers. NPS has conducted a systematic strategic planning process since 1995 that revealed poor communication processes across the campus. In 1997 a Communication Audit was conducted at the School that revealed that NPS personnel desire more information from (senior personnel) believing that senior leaders and the groups they belong to....need to be more proactive in communicating with NPS personnel....Civilians more strongly disagreed...than military....about the effectiveness of NEB
(NPS Executive Board) communication, and faculty disagreed more strongly than staff. (Suchan, p.7). NPS civilian personnel tended to mildly agree that they find out about important NPS information from sources outside the school such as the local newspaper and TV news programs; military respondents tended to mildly disagree with that perception. The difference in means between these groups was statistically significant (Suchan, p. 8).

This study explores the information environment of the NPS through an examination of the information needs of its community that embodies the complexity and wide range of communication problems inherent in public organizations. The study is based upon the assumption that the identification of the information needs of individuals within an organization can facilitate the understanding of the information environment of the organization. This understanding in turn can lead to improvements in the communication flow of information and to the organization's ability to adopt rapidly changing communication technologies and to adapt to rapid change in the external environment (Morgan, 1997).

The next section of the paper briefly describes research related to our study.

**RELATED RESEARCH**

Many studies of information needs and information seeking behavior have redefined their scope to emphasize qualitative methods of data gathering and the observation of information seekers in specific contexts. Information seeking behavior in academic, as well as other, environments have been observed and modeled (Wilson, 1997). The definitions of information need used in the study and defined for participants are: "Any question that you can't answer out of your own head." "When there's something you want to know, but don't, you have an information need." The concept of information seeking as used in this study conforms to Marchionini's (1995): a process in which humans purposefully engage in order to change their state of knowledge. The study builds on Marchionini's view that the processes needed to prosper in an organization have become more complex as social organizations have developed. Organizational communication plays a significant part in contributing to organizational effectiveness (Schockley-Zalabak, 1999; Peters & Waterman, 1982). The requirement for creation of a common understanding of organizational goals and directions (or shared vision, as it is frequently termed) is critical to successful organizational change (Kanter, 1992; Kotter, 1992; Nanus, 1992; Senge 1990) i.e., to influence the organization to adopt or change the values and the goals. In a complex organization, with a unique environment, the skills to negotiate that environment will need to be learned in the context of the organization and highly developed to successfully satisfy information needs. The next section of the paper outlines the research questions pursued in the study.

**RESEARCH QUESTIONS**

The research questions investigated in this study are:

1. What are the information needs of NPS students, faculty, and staff?
2. How do the needs vary by group and by context of the search?
3. What are the barriers to information seeking on the NPS campus?
4. What causes failure in searches for information?
5. What are the skill levels of NPS students in identifying, evaluating, and utilizing information resources, as evaluated by faculty?
6. What role does the Library play in meeting the information needs of NPS students, faculty, and staff?
7. Does the data allow for a characterization of the NPS information environment?
8. Can the results of the focus group data identify processes, information resources, or other mechanisms for improving communication at NPS?
9. How do the results of this study inform our understanding of the information seeking process?
RESEARCH DESIGN

Data Collection

Grounded theory methodology provides the foundation for the study's methodology (Glaser & Strauss, 1967; Ellis, 1993). Focus groups were selected as the most appropriate data collection technique for the study. A previous study using focus group methodology revealed the information source preferences and information needs of the community of researchers at the Navy laboratories (Duncan, 1995). Three Monterey libraries successfully used focus groups transcribed by a court reporter to identify user needs. This prior experience and a review of the literature on conducting focus groups in library and other academic environments (Connaway, 1996; Glitz, 1998; Morgan & Krueger, 1998) informed the design and execution of the study. Focus groups were structured to include a broad sample of the NPS faculty, staff and students. The composition of the 18 focus groups included: 5 staff groups, 1 for Executive Board and Academic Chairs, 1 for Curricular Officers, 3 for other staff; 4 faculty groups, 2 emphasizing teaching information needs, 2 emphasizing research information needs; and 9 student groups, 7 divided by broad curricular area, 1 for international students, and 1 for Ph.D. candidates. Groups were conducted over a three-week period in April, 1998. NPS Organizational Support Division staff facilitated the focus groups. The questions asked of the three categories of groups (administrators, curricular officers, and general staff) were slightly different. Below are listed the questions asked of the student groups:

- What information needs have you experienced while here? How did you go about meeting them?
- What information needs have you experienced while preparing for and conducting your thesis? How did you go about meeting them?
- What information needs regarding your time at NPS did you experience prior to your arrival?
- What information needs do you think you might have after leaving here that NPS could/should play a role in meeting?
- What concerns do you have that didn't get raised during this discussion?

Data Analysis

The analysis of the data gathered followed an inductive approach in which the researchers developed concepts, insights, and understanding from patterns in the data (Reneker, 1993). The transcripts yielded 40,000 lines of text, excluding facilitators' introductory and concluding remarks. NUDIST 4 was selected (Weitzman & Miles, 1995), and used to code and analyze the transcripts. The three NPS researchers developed a skeleton coding scheme that was modified and expanded as coding of the data progressed. Each NPS researcher initially coded approximately a third of the groups. A second researcher then checked the coding. If the second researcher disagreed with the coding of the first, she would add codes as needed. The coding done in NUDIST was used to generate digests grouping commentary on the major themes emerging from the data. These major themes were then summarized and analyzed. Subsets of the data were disseminated to appropriate decision-makers at the school. In addition the major issues were briefed to the highest level of decision-makers. The next section of the paper provides some preliminary results of the study.
RESULTS

Table 1 displays in tabular form the results of the coding as related to the participant category.

Table 1. Selected Examples of Coding Scheme

<table>
<thead>
<tr>
<th>1st Level of Coding</th>
<th>Group Composition</th>
<th>Pre-Matriculation</th>
<th>Extra-Curricular</th>
<th>Academic Programs</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Level</td>
<td>Students</td>
<td>Housing</td>
<td>Medical</td>
<td>Curricula and Courses General</td>
<td>Thesis</td>
</tr>
<tr>
<td></td>
<td>Faculty</td>
<td>Academic Requirements</td>
<td>Family Service</td>
<td>Registration and Scheduling</td>
<td>Faculty Research</td>
</tr>
<tr>
<td></td>
<td>Staff</td>
<td>Short Notice</td>
<td>Morale, Welfare, Recreation</td>
<td>Student Skills</td>
<td>Relevance to Military</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Computing Environment</td>
<td>Classified Research</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 provides the initial coding results of issues that the researchers identified from the listing of information needs discussed by participants in the focus group sessions. In addition to categorization by context of information search, information needs were categorized as relating to finding information within the complex campus environment. Within the category of first level needs specific areas and tasks emerged, e.g., under research, needs related to topic identification and research, theses, and issues related to military relevance of the research and classified research surfaced. The latter areas reflect the uniqueness of the teaching and research programs at NPS. These codes demonstrate both the variety of topics and issues discussed and the uniqueness of many of them to the military and to the NPS campus. Information sources included many created at NPS, such as the NPS phone book, Welcome Aboard packets, thesis manual, and website. The next section of the paper addresses the results in relation to each research question.
**Research Questions 1 and 2:** What are the information needs of NPS students, faculty, and staff and how do the needs vary by group and context?

**Table 2. Major areas of interest emerging from focus groups.**

<table>
<thead>
<tr>
<th>Issues Related to Thesis</th>
<th>Non-Academic Pre-Matriculation Information (1)</th>
<th>Registration and Scheduling Process</th>
<th>NPS Library</th>
<th>Relevance to DOD</th>
<th>Campus-wide DB of Research</th>
<th>Other Thesis Issues (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deans/Chairs</td>
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<td>Curricular Officers</td>
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<td>Other Staff</td>
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<td>Faculty</td>
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<td>Masters Students</td>
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<td>Ph.D. Students</td>
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<tr>
<td>International Students</td>
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</tr>
</tbody>
</table>

**Organizational Relationships and Resources**

<table>
<thead>
<tr>
<th></th>
<th>NPS Phone Book</th>
<th>Training (3) and Command Indocritnation</th>
<th>Campus Computing Environment (4)</th>
<th>Campus Information Flow (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deans/Chairs</td>
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<td>Curricular Officers</td>
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<td>Other Staff</td>
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<td>Faculty</td>
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<td>Masters Students</td>
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<td>Ph.D. Students</td>
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<td>International Students</td>
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</tbody>
</table>

(1) Housing, medical care options, local schools  
(2) Topic identification and selection, finding sponsors and advisors, research and writing, formatting, processing, etc.  
(3) Software and other job-related training  
(4) Software and system standardization, reliability  
(5) Including access to and dissemination of information of interest campus-wide

Indicated in the data above is the over-arching category of issues related to lack of understanding of organizational relationships. For example, the repeated discussion concerning the lack of a printed telephone directory indicates that staff, faculty, and students have difficulty knowing what department a person is in, how academic departments are structured, and how to identify appropriate personnel to answer questions and provide information. The need many participants expressed for command indoctrination confirms this finding. Table 3 discusses information sources in detail.
Table 3. Cited Information Sources

<table>
<thead>
<tr>
<th>Group Category</th>
<th>Internet/ Web in General</th>
<th>NPS Web Site</th>
<th>Intranet (other than phone book)</th>
<th>Specific Electronic Databases</th>
<th>E-Mail</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deans/ Chairs</td>
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<td>Curricular Officers</td>
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<tr>
<td>Group Category</td>
<td>NPS Library</td>
<td>Other Libraries</td>
<td>Specific Electronic Databases</td>
<td>Books and Journals</td>
<td>Trusted Human Sources (1)</td>
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<tr>
<td>Deans/ Chairs</td>
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(1) Peers, student sponsors, NPS faculty and staff, people external to NPS

The data presented in Table 3 has been collapsed from a coding scheme of information sources that included 50 codes and many subcodes.

Research Questions 3 and 4: What are the barriers to information seeking on the NPS campus and what causes failure in information searches?

Analysis of the data revealed that inadequacies in the campus computing environment and network infrastructure accounted for many of the barriers in finding information. Access to the Internet, incompatible hardware and software, inability to find information about NPS on the NPS web sites, and a plethora of databases of varying currency and accuracy were all cited as problems. The lack of a centralized information source, i.e., linking of databases with information concerning student body size and composition, research grants, data concerning current budget status of expenditures for staff and equipment, contributed to frustration in the information seeking of many of the focus group participants. Many participants mentioned the need for a campus-wide database of topics of research interest both for
the students and for the faculty. NPS executes approximately $30 million of research funds each year. Obtaining these funds each year must cover a significant portion of a faculty member’s salary. In order to maintain the relevancy of NPS research to DoD requirements and to easily identify problems of sufficient interest to have a strong likelihood of being funded, participants desired an easy location on campus to determine what topics meet these criteria.

Officers receive orders to attend NPS while at commands in many parts of the world. Although frequent moves are a normal part of military life, the officers assigned to NPS expressed unmet information needs regarding housing, medical care and schools in the Monterey area for their dependents. Information about scheduling and the requirements of specific academic curricula was also perceived as inadequate. Academic requirements such as course load and sequence are also a source of significant needs at NPS as at other educational institutions. In addition, it was clear from many of the focus groups that inadequate library collections are sometimes a barrier to successful information seeking:

Research Question 5: What are the skill levels of NPS students in identifying, evaluating, and utilizing information resources, as evaluated by faculty?

The faculty evaluated the skill levels of students. The results of the data analysis indicated that faculty consistently rated their students higher in skills in identifying information, than in evaluating it or using it in their daily tasks.

Research Question 6: What role does the Library play in meeting the information needs of NPS students, faculty, and staff?

The Library was mentioned as an information source in all 18 sessions. Mention of the Library as a source included widely differing comments on its effectiveness in satisfying the information need of the participant. The focus group study was announced on campus in the context of the NPS strategic planning process and the communication problems identified in that process. The researchers made a concerted effort to generalize the process of selecting participants and structuring the questions to avoid having the participants believe that responses should address library materials or services. Some respondents found information about the Library and its resources difficult to obtain, or were not aware of the means to locate information within its collections. An important result of the study is to raise awareness in the Library of the lack of knowledge on the campus concerning library collections and resources.

Research Question 7: Does the data allow for a characterization of the NPS information environment?

The data demonstrates both the complexity and uniqueness of the NPS environment, and the difficulty that all members of the academic community experience in navigating that environment. Military personnel are "at sea" regarding the academic structure. Similarly, many civilians do not understand the base operations or how the military chain of command relates to the academic hierarchy of department chairs and deans.

Research Question 8: Can the results of the focus group data identify processes, information resources, or other mechanisms for improving communication at NPS?

The data gathered in this study has potential to pin-point profitable areas for improvement in communication at NPS. Understanding the unique environment of the School and the specialized information needs of the campus community is crucial to targeting changes that will bring relevant information to the whole campus. Since the data was gathered in the spring, 1998, there have been significant improvements in the availability of information relating to housing. In addition, a rewiring of the campus network and related improvements brought about by campus-wide use of a standardized email system have brought easy access and means of communicating information campus-wide. These improvements in the campus network infrastructure appear to have addressed some of the barriers experienced by the study participants. For example the NPS intranet has been developed and is used more widely as a means to distribute documents such as the NPS Strategic Plan, reports of various faculty committees, and the WASC accreditation self study.
In other instances, such as the lack of knowledge about where to find information about current campus events, the lack of understanding of NPS organizational structure perpetuates the barriers and frustrations on the NPS campus. Orientation of new faculty and students not only to structure, but also to the campus services, such as housing, registration, medical care, and Library collections and services, will be an important method of decreasing barriers to information seeking. To obtain improvements in the campus information environment will require both an awareness of the barriers and failures, and the willingness and ability to address the concerns. The process of feeding the information from the study, both an analysis and the full text segments, into the administrative structure of the organization has had mixed results. The housing issues remain critical on campus. Mechanisms for communicating information about housing procedures have been improved through the use of web pages and production of a descriptive video. Briefing the major issues to the highest levels of campus administration was effective in improving an understanding of the issues. The identification of deficiencies in the network infrastructure has informed administrators’ understanding of how current improvements in that infrastructure may decrease the barriers to successful information searches. The knowledge of the barriers created by the lack of availability of campus-wide information on budgets, research topics, course and student data, etc. has focused attention on the need for improvements in these systems.

Research Question 9: How do the results of this study inform our understanding of the information seeking process?

Spink (1998) and Wilson (1998) have developed and built upon current models of information seeking behavior. The data from this study provides evidence that the context of the seeker’s environment, and the expectations the seeker brings to the process are important aspects of behavior that need to be built into these models. Spink’s (1997) concept of the introduction of feedback into interactive information seeking and retrieval provides a framework for consideration of the feedback of the information needs, failures, and barriers into the development of information systems within the NPS organization. We will further examine the results of our study in the context of the development of information seeking models.

DISCUSSION

To disseminate the results of the study, a presentation highlighting the areas of major concern was given to senior administrators and the chairs of the academic departments. The data on housing, theses, international students, the library, and medical and classified information issues has been distributed to the appropriate administrative groups to inform them of the issues raised by the participants. The brief, exploratory results of the data analysis reported above indicate the richness of the data set, and preliminary answers to the research questions resulting from the first pass at analysis, i.e., by coding for context, participant, failure, sources of information, and uniqueness of NPS environment. The study reveals that students, faculty and staff at NPS are proactive and competent information seekers. However, they are frustrated by lack of understanding of the complex environment which overlays the military organization upon the traditional academic structure. Specific barriers to successful information seeking are an inadequate network infrastructure, stove piped information systems, and a lack of knowledge of what information about NPS is available on the campus.

The study demonstrates that the focus group technique can be used to successfully identify information needs and that an analysis and understanding of these needs and barriers to successful information searches can inform an organization of methods of improvement in the organizational structure and processes. However, there is no attempt to demonstrate the validity of the needs identified by triangulation (Potter, 1996). The reliability of the needs identified, however, seems to be confirmed by the consistency with and general agreement on the needs which were reported within the various groups, i.e., administrators, staff, students, and faculty. The study is bound by the limitations of data gathered only on one specific campus, in one military organization. The study is limited in its sampling of members of the campus community. The study should be replicated to determine how changes and or improvements in the campus network infrastructure have influenced barriers to successful searches. In the rapidly changing world of scholarly communication, with more scholarly information available in electronic format, the role of the Library in
providing information resources and in teaching their use should be examined in additional studies. The concept of barriers to successful information searches should also be examined.

CONCLUSION AND FURTHER RESEARCH

The uniqueness of the NPS environment, however, contributed to one of the fundamental results of the work, i.e., the importance of the context of the information search, and of the understanding of the searcher of his or her information environment. In a world of continually shifting scholarly information resources, the need for information professionals to educate their clientele in the structure, complexity, and reliability of the changing environment makes critical our understanding of the information search process and the context in which a search is made.

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