Women's Role in the Development of the Internet

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INTRODUCTION

The majority of the literature written about the history of the Internet has focused on chronicling only the technical milestones that led to its development. In doing so, most have overlooked a significant period in the Internet's history, the period bounded by the retirement of the United States Department of Defense Advanced Research Projects Agency's network (ARPANET) in the late 1980s and by the commercialization of the network and the excitement over the World Wide Web browser in the mid-1990s. The historical accounts, as a result, include little more than a passing mention of the National Science Foundation Network backbone project (NSFNet) and Merit Network, Inc., which conducted the transfer of this technology to society at large from 1985 to 1995.

Additionally, the literature holds little evidence of women as a force in the Internet's early development. For example, in *Inventing the Internet*, the most thorough book published to date on the history of the Internet, Abbate (2000) mentions more than 60 different men who were involved in the Internet's development but does not recognize a single woman other than to show a female model advertising a computer. The contribution women made to developing the Internet is similarly neglected in Kristula's *The History of the Internet* (2001), Griffiths' *From ARPANET to World Wide Web* (2002), and Castells' *The Internet Galaxy* (2001).

Overall, readers of the Internet's history are left with the impression the Internet was developed solely by men. This impression is incorrect, as is the impression that the Internet's success is solely the result of a series of technical achievements.

This article presents evidence that many women were employed in the Internet industry prior to the mid 1990s, filling in gaps in the literature on this point. In addition, it suggests that, collectively, women may have held a key role in the extraordinarily successful transfer of the internet technology from a small circle of academics and governmental researchers to society at large. The findings presented here are part of a larger body of work examining the role women held in the Internet's development, carried out at Eastern Michigan University for the completion of a master's thesis in interdisciplinary technology (Repucci, 2004).

BACKGROUND

Data for this study came from interviews conducted with eight of the early participants in the NSFNet project,[1] original source documents, and my own observations and knowledge acquired while employed on the NSFNet project. The individuals interviewed for this research were all employed on the NSFNet project, either by Merit Network, Inc. or by the National Science Foundation's division of Networking and Communications Research Infrastructure (NCRI). They included:

- Merit staff
  - Eric Aupperle, President
  - Elise Gerich, Associate Director of National Networking
  - Susan Hares, Internet Engineer, National Networking division
  - Ellen Hoffman, Manager of Network Information Services
  - Jo Ann Ward, User Services Specialist, Network Information Services division
  - Jessica Yu, Internet Engineer, National Networking division
- National Science Foundation (NSF) staff
  - Stephen Wolff, Division Chief NCRI
  - Jane Caviness, Deputy Division Director NCRI

Table 1. Merit's NSFNet Staff, May 1992

Division	Females	Males	Total	Study Participants
Internet Engineering	4	8	12	Gerich, Hares, Repucci,[2] Yu
User Services	6	3	9	Hoffman, Ward
Network Operations	8	10	18	none interviewed

Note: The data are from Merit's 1992 Organizational Chart (Merit, 1992, May 1)

Employee statistics, presented in Table 1, of the Merit staff who were assigned to the NSFNet effort came from Merit's organizational chart dated May 1992, the last such chart found before the transition of the backbone to a commercial provider. Its purpose is simply to show the gender makeup of the staff during this project, and thus the timeframe of this study. These numbers should be viewed in light of the following historical perspective: "Before NSFNet came along and Merit started to grow, Merit only had one female ... outside of the secretarial staff" (E. Hoffman, interview, February 23, 2003).

Note that while the engineering staff had half the number of women as men in 1992, the User Services staff had the opposite proportions: twice as many women as men. While the published history of the Internet to date has focused on the efforts of the engineers and computer scientists, this paper suggests that the contributions of those involved in the user services campaign were equally important to the success of the Internet's early development.

While this research focuses primarily on the gender makeup at Merit, Merit was only one of the many organizations involved with the NSFNet project where high profile women in the field were employed. A sampling of women from other organizations mentioned in the interviews include: Allison Brown at Cornell University, Deborah Estrin at the University of Southern California, Darleen Fisher at the National Science Foundation, Priscilla Jane Houston at Rice University and the National Science Foundation, Radia Perlman at Digital Equipment Corporation, and Lixia Zhang at Xerox Palo Alto Research Center. Clearly, women were involved in the development of the Internet, and the interview data shows that many were considered key contributors as seen from the interview data.

The concept of inclusion served as a central theme in the examination of gender roles within the project. To this end, the study focused on the formal and informal strategies used to make the Internet more socially inclusive. For the purposes of this work, inclusion was defined as satisfying the following three conditions. First, there must be a clearly stated intent to broaden the user base of the technology. Second, a proactive effort to broaden the user base must accompany the stated intent to do so and the techniques to carry this out must include persuasion as well as educational efforts. Finally, there must be evidence that the user base was, in fact, broadened.

MAIN THRUST OF THE CHAPTER

Originally, this work was undertaken to document the participation of individual women in the Internet's early history. However, in examining the role these women played during this period of history, evidence began to emerge that, while they held a variety of positions and titles that in themselves were impressive—management, engineer, and so on—they also collectively played a key role in the transfer of internet technology to society at large. Specifically, this research suggests that the collective action of the women who were involved in the NSFNet project energized the Internet to be more socially inclusive.

Evidence of women's involvement in the Internet's early history was found in both the interview data and in original source materials. A sampling of the evidence suggesting that women were indeed actively engaged in creating an inclusive user community for the emerging Internet is provided below, presented by the qualifying factors of inclusion, as previously defined.

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