A Longitudinal Study of IS Job Skills 1992-1997: Research in Progress

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Abstract

This article summarizes a longitudinal study of technical skills advertised in the IS job market. A data collection approach that exhibits certain strengths over previously published job skill identification strategies is justified. Approximately 20,000 newspaper position ads in large metropolitan areas of the U.S. were collected over six years to establish the empirical foundations and analyze trends in the requested job skills. The data provides implications applicable to practicing IS managers, general managers, professionals in the IS arena, human resource staff, and educators. In support of previous theory there is a shift in the number and type of skills that a typical IS employee is expected to have. This shift may mean that the new IS professional will be a generalist with a collection of specific technical skills in networking, personal computers, Windows, and relational database technologies which were identified as the top four job skills in this work in progress.

Introduction

The current popular literature reminds us of the shortage of skilled IS professionals and our own students remind us of the salaries that are being paid to attract these skills. The Bureau of Labor Statistics sees the demand for more than 1.3 million additional information technology professionals between 1994 and 2005. Moreover, the Department of Education reports that the supply of computer science graduates declined more than 40% between 1986 and 1994. The authors also quote Howard Rubin of Hunter College that deficiencies in IS personnel supply are expected to cost US businesses up to $500 billion per year. These shortages and their associated costs underscore the timeliness of the current research and are a further justification for the importance of research aimed at identifying the IS skills most in demand. Identifying the skills most currently needed opens opportunities for not only traditional university curricula but for direct route strategies for increasing the supply. Despite the market imbalance, there is no timely and comprehensive identification of the skill set that can keep pace with what employers want.

Selected Literature

In 1992, Leitheiser summarized much of the information systems job skills research of that time in his article, “IS Skills for the 1990’s: A Survey of IS Managers’ Perceptions.” Leitheiser’s summary of the normative academic research started with the various ACM and DPMA curriculum guides, and the skills studies of [12] and [4] for systems analysts which ranked people skills above technical. He felt that a weakness was that most studies used logically derived lists of skills while [1] and [17] had the advantage of empirically and systematically attempting to use a “talk aloud protocol” methodology for capturing categories of skills actually used in the development process by systems analysts. Leitheiser’s criticism seems to support the non-normative, empirically-oriented methodology such as the want ad research of this paper.

Trauth, Farwell and Lee (1993) noted that the “skill mix for many IS professionals today favors technical expertise over people handling ability.” An important finding for their focus group was that “a rich combination of human, technical, and business abilities is the key success driver.” As with many other studies in the literature, this one had geographic coverage restricted to the New England area.

Lee, Trauth, and Farwell (1995) studied the changes that were taking place in the IS industry in the northeast U.S. and the impact that the changes had on the skill and knowledge requirements of IS professionals. Their major findings suggest that industry demands more knowledge and skills in “multiple dimensions” and that a “generic curriculum to meet the educational needs of all future IS professionals is obsolete.”

Todd, McKeen and Gallupe (1995) examined 20 years of want ads in selected newspapers to determine the changes that had taken place in the skills requirements for IS programmers, systems analysts, and managers. Their focus was on the balance of skill types needed by each of the selected positions. While valuable in the current study as a justification for the use of want ad data, only three job classifications were examined. Consequently, the skill mix employed by Todd et. al. may not be applicable to the variety of jobs in existence today and the job mix since the mid 80’s (Davis and Olson, 1986).
Popular current studies offer a list of technical skills that are similar to those in this study. A comprehensive study released by RHI Consulting and reported in The Nanosecond highlights skills that CIOs found important. Networking was ranked as the top skill by 32% of the 1,400 CIOs, followed by Internet/Intranet development (18%), programming (13%), help desk/end user support (12%), project management (9%), and systems analysis (7%). How the skill sets were classified and presented to the CIOs was not stated.

**Justification for this Research in Progress Work**

The previously cited works have shortcomings as mentioned. Further, much of the work argues for the relative importance of a type of skill over that of another – e.g. the relative importance of technical over business skills. The goal of this research is not to side with either position; but rather to suggest that both skill types are important because of the dynamic nature of and expectations placed on professionals in the IS business. Moreover it appears that technical skills are easier to capture and analyze on a consistent basis across time and different studies and provide a more stable basis for comparison. Perhaps the media of newspaper position advertisements is of itself responsible for a bias towards the immediate and easily identified technical skills that could be reported within the brevity of a typical position ad. The review of the want ad based research supports an emphasis on technical over other skills. The point of this research is to identify and analyze the technical skills that are most demanded and to provide implications relevant to those who interface with today’s IS professional.

**Brief Methodology**

This work in progress assesses the technical skills needed by IS professionals via the medium of position advertisements placed in newspapers on a Sunday in April over a six year period. This methodology is based upon the work of Athey and Plotnicki (1992), Winer (1989), Todd, et. Al (1995), and others. The criteria used for selecting an ad were designed to capture the jobs most likely to be filled by an IS professional. For example, advertisements under such headings as scientific programmer, data processor, analyst, computer consultant, etc., were screened out as were clerical jobs.

The classification scheme used to capture skills in this work has been modified each year since 1993 to include the newest and emerging skills that are sought in more than 5% of the want ads and to reclassify those skills that appear in fewer than 5% of the ads. Although this judgmental base represents a study weakness, it improves the relevance and immediacy of the findings.

**Initial Findings**

A graph of the top-ranked technical skills for IS professionals for six years is presented in Figure 1. Note that these skills represent a broad spectrum of IS professional position skills that are not confined to a restricted geographic area. Some of the previously cited studies included a limited number of approximately three job classifications or were gathered from data that represents only a geographic portion of the U.S. The number of positions used in prior studies sharply contrast with the twenty-four IS positions listed in the 1995 ComputerWorld annual salary survey. Further, the skills represented here are those advertised as needed in major metropolitan areas across the U.S. rather than in a restricted geographic region. Future research might use this data as a baseline for demand and match corresponding supply data for measures of imbalances, effects on prices of personnel, and other important issues for the IS industry. At the present the importance of these skills leads to implications that are appropriate for practicing IS professional, human resource recruiting personnel, IS managers, general managers, training professionals, and educational institutions. One important contribution of this work is to introduce a baseline of skills that academics can apply in the job skill research arena.

**References**

References are available upon request from the authors.