December 2001

An Update on Measurement of IT Job Skills for Managers and Professionals

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Abstract

Approximately forty technical skills have been estimated to comprise the portfolio of a typical IT professional (Rada, 1999). Here, thirty-eight significantly demanded IT technical skills are identified and a taxonomy to characterize a hypothetical IT professional's portfolio is developed. This is a longitudinal research study with findings on job skill demand, innovative methodology, and an easily accessed, and comprehensive database of IT job skills that should be useful to these concerned with the acquisition and management of IT job skills.

Introduction

This is a report on a IT job skills research in progress with the following set of objectives:

> 1) Introduce a taxonomy of job skills as a tool in classification of the technical skills in a portfolio for a hypothetical IT professional. 2) Present a taxonomy useful for establishment of the portfolio. 3) Offer unobtrusive measures as a robust methodology for collection of IT professional job skill demand data. 4) Supplement an established manual data collection methodology for unobtrusive measures with collection by an Internet search engine, and 5) develop criteria and obtain feedback for a publicly available and easy to use database of IT job skills

Part of these objectives has been met through a decade of research and data collection via unobtrusive measures. Other objectives could be met over the next year with continuing research efforts and additional funding from a National Science Foundation Information Technology Research grant proposal.

Job Skill Taxonomy

A major part of this research in progress is the introduction of a taxonomy of technical IT job skills for classification of the job skills advertised in the national job markets for IT professionals. This taxonomy currently consists of thirty-eight skills developed over a ten-year period via analysis of more than 20,000 job ads from the Internet and newspaper want ads. These ads are collected at a set point of time and represent nine major metropolitan areas across the U. S. The taxonomy is partially presented in Table 1 and discussed there.

The Use of Unobtrusive Measures for Data Collection

Much of the empirical and academic job skill research is based on traditional focus groups, telephone interviews, and traditional mail surveys of managers and IT professionals. This type of research has problems noted in the Computer Research Association report (Freeman and Aspray, 1999). A notable exceptions is the work of Todd, et. al. (1995). In contrast the methods used for this in-process research are based upon the methodology known as unobtrusive measures (Babbie, 2001) and eliminate much of the subject selection bias and sampling problems of the majority of academic empirical work on job skills. The unobtrusive measures method for job skills research was pioneered by Athey and Plotnicki (1992) and extended by Litecky and Arnett (1992).

Internet Search-Engine Based Methodology

The foundation for this research rests on unobtrusive measures for data collection. For example, beginning in 1992, newspaper want ads were counted and then content analyzed to measure demand for specific job skills. Beginning in 1998, the Internet, especially Monster.com (formerly the monster board) received considerable attention as the "new" method to advertise for IT jobs. In response the researchers began an unobtrusive data collection from the IT web site, Monster.com, to assess demand and types of positions between newspapers and the Internet as represented by the ads on Monster.com. Arnett et. al (1997) noted a 48% increase in newspaper ads from approximately 3700 in 1996 to more than 5,400 in 1997. Perhaps, not surprisingly, the same authors reported a decrease to fewer than 3,200 newspaper ads in 1998 (Arnett, Litecky, and Prabhakar, 1998), but they reported 467 Monster.com ads during the same snapshot period and suggested the newspaper decrease was a clear indication of the Internet's coming use as an important medium for job advertising. More recently the number of newspaper ads has fallen to 2,064 in the nine cities studied on one day in 1999, and the number of Monster.com ads for the same period was more than doubled. (Refer to Table 1). This finding provides additional evidence that the Internet has probably become the most used medium for advertisement for IT jobs. Consequently, the use of search engines seems to be an appropriate replacement for manual collection of newspaper ads. Moreover the search engines can provide larger sample sizes, faster and more current data as stressed in the CRA report. Yet the use of search engines has its disadvantages for job skill analysis. For example, multiple mentions of the same skill in the same job ad leads to over counting.

Selected National Sample of Job Skills

The table below illustrates the taxonomy mentioned above and provides evidence of the skill demand based on multiple sources. This particular data set was obtained by sampling and an analysis of nine major newspapers and the same cities via the Monster.com during April, 1999. This data is dated, but illustrates what is planned to be available in the completed research.

Table 1. IT Technical Job Skills from Major U.S. Cities

	Monster.com	Newspapers	Joint
COBOL	5.35	8.34	8.0
C	8.35	6.74	6.9
C++	15.85	11.23	11.8
Visual basic	9.42	10.91	10.7
WWW	14.63	4.49	5.7
Mainframe	9.85	4.49	5.2
Midrange (IBM)	6.42	7.06	7.0
UNIX	26.12	15.08	16.5
PC General	10.06	6.52	6.9
Windows '95	22.27	10.27	11.8
Microsoft Office	14.13	5.45	6.6
Oracle	15.85	11.87	12.4
Other Relational	11.78	5.13	6.0
SQL	18.42	9.95	11.0
Unclassified	9.42	11.23	11.0
Network General	6.21	9.62	9.2
Network - Novell	10.49	8.98	9.2
Network - Win 'NT	33.83	21.17	22.8
Internet	16.49	7.38	8.6

Source: 2,428 ads in newspapers in nine major cities and 5,064 ads from the same cities on Monster.com (unpublished). Items with less than 5% joint frequency omitted.

Publication of a Public Access Database for IT Job Skills

The previously cited CRA report noted the problem of the absence of easily accessible IT job skill databases for research purposes. The CRA stressed the inconsistency of classification within previous research in relation to the production of existing IT job databases. This research can be converted to a one-time database that addresses the previously cited classification problem. However, so doing does not address the continuing needs of users of a job skills database. Therefore, a National Science Foundation, Information Technology Research proposal has been submitted that addresses this need and proposes a job skills database (Litecky and Arnett, 2001). A comprehensive annually updated, national sample of IT job skills would be served via a SQL Server database engine, allow web browser and FTP access, and provide for data selection by flexible criteria.

It is anticipated the discussion of the NSF portion of this report at the AMCIS 2001 conference would provide an opportunity for leaders in the academic community to guide the specifics of the research database. Previous conventions have indicated a high level of interest in portfolios of job skills for curriculum development, professional development, relationship tie-ins with the business community, and the thrust of IS as an academic discipline.

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