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PowerPoint Slides of AIS Presentation

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Introduction

With the pace of technological change today, it is nearly impossible to keep the IS curricula current. Skills and knowledge change so rapidly that it is difficult to keep up. The half-life of the technical knowledge of consultants today, for example, is approximately six months (Ernst & Young, 1994). This presents a unique challenge for IS educators, who must develop and maintain a curriculum that balances theory with enough current technical knowledge that students can land that all-important first job, and yet be well-grounded in information systems concepts that they can continue to develop as IS professionals as technology changes.

Todd et al. (1995) recently published the results of a study that showed that IS job skills have shifted greatly since 1970. Their study involved a content analysis of a sample of IS job advertisements from four major newspapers at five-year intervals. While their study is an important contribution to understanding how IS job skills have shifted over the years for programmers, systems analysts, and IS managers, the usefulness of their results is somewhat limited for curricula design for the future because of its historical nature (the most recent data it is from 1990). What is needed is a methodology for identifying trends in the marketplace soon enough to allow faculty members time to respond in their courses. This paper presents such a methodology.

The purpose of this paper is to analyze the recent shifts in job skills sought in IS job advertisements. From this data set, individual skills and groups of skills can be tracked over time, and recommendations can be made that will help with curriculum design.

It is important to view skills both over time and across regions. Todd et al. (1995) showed the value of the time dimension; King (1993) found significant differences from city to city within a single region for the one year he studied.

Methodology

The data presented in this paper are from two different regions of the country for a six-year time period (1990 through 1995). The *Dallas Morning News* was chosen to represent the southwest region of the country, and the *New York Times* was chosen to represent the northeast. This same methodology could be used in other areas of the country as well.

Every computer-related job advertisement in the selected papers was analyzed for the job skills being sought. To maintain consistency across regions, and across years (to avoid any seasonal influences), the paper from the first Sunday in March was chosen for each city and year. Each IS-related skill mentioned in the job advertisement was coded. If the

skill was mentioned multiple times in the same advertisement, it was only coded once. Therefore, this study may be viewed as a study of skills sought at the firm level, rather than at the individual level, since individual jobs were not coded.

After this coding, groups of related skills were developed for the trend analysis that is presented below. For example, COBOL, Fortran, and Pascal were all combined into the 3GL category; Paradox, Sybase, dBase, and so forth were all combined into the relational database category. This allows for tracking the skills over time that are necessary for curricula design. The top tool or skill in each group is also reported, for the benefit of those who need to know **which** CASE tool is the dominate CASE tool in the market today or which client/server development tool it is currently hot.

Results

The results from this study are presented in Figures 1 and 2 below. Those skill sets that appear to have increased in importance are presented in Figure 1, while those that have only held their own or have decreased in the number of firms seeking those skills are presented in Figure 2. In both figures, an index line is shown for the national Help-Wanted Index that is produced by the Conference Board on a monthly basis. This index is included to give an indication of trends in all help wanted advertisements over the same six-year time period covered by this study.

By examining Figure 1, it is obvious that all four groups of skills included on this figure have experienced rates of growth that exceed the Conference Board index. In March 1995, the groups of skills that are most sought by firms in this sample are object oriented, network, and relational database skill sets. The leading object oriented skills are C++ (131 ads) and Visual Basic (79 ads). In comparison, Smalltalk only had 17 ads for third place in this category.

The leading network skills sought in 1995 are Unix (139 ads), Novell (72 ads), TCP/IP (34 ads), and WAN (24 ads). Unix was included in this group of skills because of its prevalence in client/server and internet applications. Even without the inclusion of Unix in this group, it still would have been one of the skill sets included in Figure 1.

The leading relational database skills sought in 1995 are Oracle (83 ads), Sybase (71 ads), DB2 (67 ads), and SQL (45 ads). Finally, the leading client/server skills mentioned in the 1995 want ads are Windows (88 ads) and OS/2 (37 ads) for the GUI front-ends to client/server applications, and PowerBuilder (52 ads) for the development of these applications. Gupta, the other leading client/server development tool, was only mentioned in nine ads.

Of the skill sets that have not outperformed the national help wanted index, third generation languages are still very prevalent in the current want ads (overall, they are in fourth place out of the eight categories in this study). The leading 3GL sought in want ads today is C (120 ads), followed by Cobol (90 ads). Demand for C has grown from 91 ads in 1990 to the 120 ads today, while demand for Cobol has dropped from 129 ads in 1990

to 90 today. RPG shows an amazing ability to persist in the marketplace, with 31 ads for it in 1995.

Mainframe-related skills have shown the largest drop in demand relative to the help-wanted index, and relative to all of the other categories (demand has dropped 40 percent in the six years studied). The only mainframe skill that really stands out from the others in 1995 is CICS (57 ads).

Despite all of the glowing projections for the future of fourth generation languages and CASE tools, the results of this study indicate that neither of these groups of skills are widely sought after by employers, nor have they been in the last six years. The leading 4GLs are Adabus/Natural (16 ads) and Informix (14 ads). The leading CASE tool is IEF.

Implications

In order to keep the IS curricula current, faculty members must keep abreast of changes in the marketplace for skill sets that employers find desirable. The content analysis of classified advertisements it is one methodology for doing this. Keeping in contact with major recruiters of your students, through visits or an advisory board, would be another way of obtaining similar information, though it would not necessarily reflect changes in the marketplace as a whole. Nationwide surveys or projections are yet another methodology, but they may not reflect changes in the marketplace that your students face.

Only by tracking technical changes over time on a regular basis will faculty members detect new technologies or skills that will become important to our students upon graduation. For example, five years ago client/server development essentially did not exist, and the classified advertisements reflect this. But tracking the growth of demand for tools like PowerBuilder (1 firm in 1992 to 52 firms in 1995) in classified advertisements allows faculty members to see the increased importance being placed on a new tool like this that firms are, at that time, hiring for.

The results in this study show an increased importance in client/server development, networks, relational databases, and the object-oriented development paradigm. There has been a decreased emphasis on traditional development in third generation languages, and on mainframe technologies, and fourth generation languages and CASE tools have not met expectations.

Conclusion

The methodology presented in this paper presents one way of tracking changes in technical skills that are sought by firms that hire IS personnel. While the methodology may be skewed somewhat by the nature of firms that advertise in the classified advertisements of the local paper, it does provide a valuable window into the skill set requirements of a broad cross-section of firms today. It also provides a convenient way to track those changes over time for a particular geographic area.

The other implication of this research it is that since desired skill sets are changing so rapidly, faculty members must be careful to develop curricula that are flexible. At Baylor, for example, we have revised our curriculum to include two six-hour courses labeled IS Development I and II. Within these courses, we have the flexibility of changing topics on a semester-by-semester basis, if necessary, without having to seek university approval or make catalog changes that would take two to four years to become effective. For example, the faulty members decided this summer to change the programming language that we use to teach concepts from COBOL to C and C++. This change will be effective this fall with no administrative red tape to battle through. As other trends in the marketplace are detected, these courses will be modified in a similar way, thus providing our students with the most up-to-date curriculum we can design.

References

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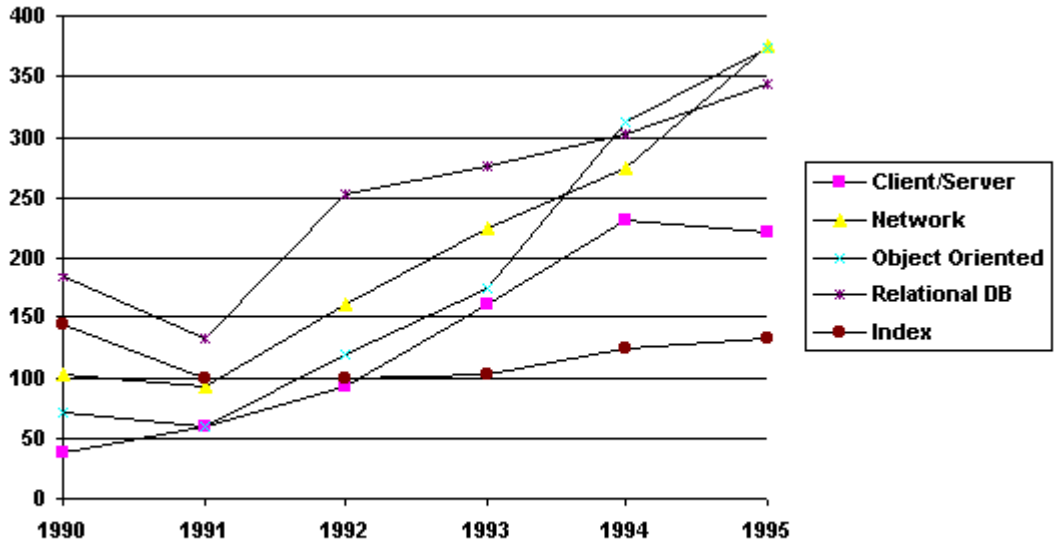

Figure 1. Help-Wanted Categories Increasing in Importance

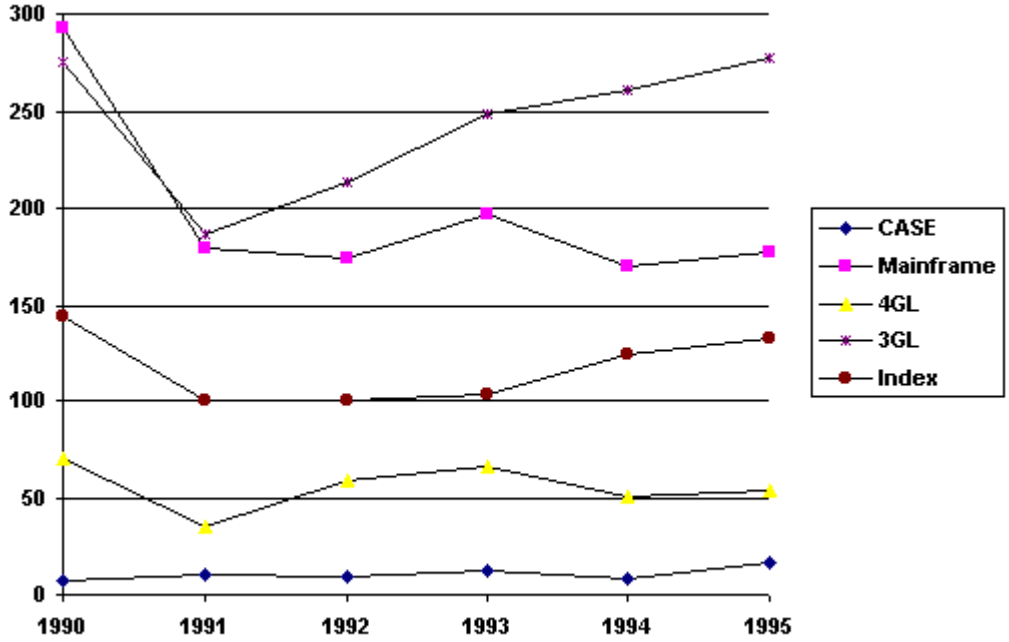

Figure 2. Help-Wanted Categories Decreasing in Importance