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Entry Level Jobs For MIS Graduates: Implications for Academic Programs

ABSTRACT: This paper reports on a set of research studies conducted to identify the size and composition of the entry-level IS job market, including job types, job vacancies, and skills and attributes required of applicants. Three types of data were collected from the metropolitan area of Vancouver, Canada: mail survey data, phone survey data, and job advertisements.

Analysis reveals four generic entry-level job types: programmer, analyst, user support, and technical support. To a varying degree, these jobs are available in both IS and user departments.Programmer and technical support positions are more prevalent in IS departments; user support and analyst jobs are more prevalent in user departments.

Employers reported strong interest in an applicant's potential ("ability to grow and develop")and communication skills when hiring for entry-level positions. However, there was a gap between IS managers' stated preference for soft skills and the job advertisements' requirement for experience with specific programming languages and platforms. Implications for curriculum and for future research are discussed.

Skills and attribute requirements differ between job types, and this information is presented as prescriptive advice to guide student preparation and MIS program content.

KEYWORDS: MIS Curriculum, Lower and Upper Division, IS Jobs, Career Trends Entry-Level Jobs for MIS Graduates: Implications for Academic Programs

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INTRODUCTION

Historically, as information systems (IS) began to support most of the functions of businesses and IS departments in large companies grew in size, business faculties began hiring computer-trained faculty to teach the theory and practice of this new business tool. The Management Information Systems (MIS) offering was usually a single course for all business majors. During the 1980s and '90s, many faculties developed a full slate of MIS courses designed to produce an MIS major alongside majors such as marketing, finance, and accounting.

At the time these programs were created, there was no experience to guide program and curriculum development. Many questions were left to the vision of the founding faculty. For example,what reference disciplines should be included - psychology, computer science, organizational theory,mathematics? Was the MIS major to be an abbreviated Computer Science degree? Where should emphasis be placed—on theory or on practice; knowledge or skills?

Another missing piece of information was the market for these new graduates. Would they compete against computer science majors for the same jobs? Were there jobs for a business graduate with a few MIS courses? If so, what were they and what skills and knowledge did they demand?

After several years of providing only service-level MIS courses, the Faculty of Business Administration at Simon Fraser University (SFU) introduced an MIS major. In 1994 and 1995, research was undertaken to identify the job market for graduates in the lower mainland area of Vancouver, Canada, an area with approximately 1.5 million residents. Three studies have now been completed, and this paper reports on the findings.

The paper is organized as follows. In Section 2, a review of the previous research is presented. Section 3 describes the four SFU research studies. In Section 4, findings about entry-level IS jobs and the issues faced by business graduates are presented. Section 5 contains recommendations for curriculum and further research.

RESEARCH ON IS JOBS AND SKILLS

Since 1990, there have been several articles published pertaining to IS jobs and skill requirements [1, 2, 3, 4]. Although they add little to our understanding of the entry-level job market for university/college graduates, their findings strongly support the need for MIS courses and programs within business faculties.

Todd, McKeen and Gallupe [5] analyzed advertisements for IS positions from 1970 to 1990 to identify changes in the skill requirements for programmers, analysts, and IS managers. Contrary to their expectations, they found that the stated demand for business knowledge and interpersonal skills had remained stable over this period of time, and that technical requirements for analysts, as reflected in the ads, had actually increased.

One study focused on the skills required for new MIS hires. Watson et al. [6] used a decision support environment with 20 IS managers to produce a list of skills and to rank them for three entry-level IS job types: programmer, systems analyst and end user support personnel. The results reflected their belief that different job types require different skills.

THE SIMON FRASER UNIVERSITY RESEARCH

Mail Survey of Overall IS Job Market and Job Skills

A 6-page survey instrument was designed by the author to capture information on the local job market, the respondents' perception of various educational institutions, and the skills needed for IS jobs. It was sent out to head of IS and the head of Human Resources of 182 local organizations. A total of 107 usable replies were received. These are mid size companies, for the most part, with the average number of employees being 2000 and the median being 700. Their IS departments range from a few individuals to a hundred employees. Job areas of the respondents were as follows: 60% IS managers, 24% general managers, 7% human resource managers, and 9% had unknown job titles.

In the next sections, this research will be referred to as the "overall study" since it dealt primarily with the whole IS job market, not the entry-level job market.

In order to capture more information about entry-level jobs, the 1995 graduating class of MIS students conducted the following two research projects.

Telephone Survey—Entry-level IS Job Types and Skills

One student team contacted 40 managers and asked each one, through a structured interview, to describe the entry level job types in their organization and the skills required for each. They were also asked to rate the general importance of various personal attributes and technical skills. The respondents had the following job profiles: 66% IS managers, 20% general managers, and 13% human resource managers. In the following discussion, this survey is referred to as the "telephone study."

Analysis of Job Advertisements

Another team of students gathered advertisements for local IS jobs for the previous 12 month period. Sources for this data included the newspapers, university placement services, and government placement services. Care was taken to eliminate duplicate ads. From the 200 ads collected, the students extracted and analyzed 55 ads which could be considered entry-level since they require either zero, one or two years of experience. Jobs with one or two years of experience were included because MIS co-op graduates have two years of experience. Jobs were classified into job types and the skills required of each type were identified. This research will be referred to as the "ads study."

FINDINGS REGARDING ENTRY-LEVEL JOB TYPES AND SKILLS

Frequency of Entry Level Jobs

Because of the movement towards outsourcing and downsizing in many organizations, we were unsure if there was still a market for skilled but inexperienced people. Table 1 summarizes our findings regarding the prevalence of entry level job types.

We can see from these statistics that most, but not all of the companies surveyed did have entry-level job types. In addition, over 1/4 of actual jobs posted were for entry-level applicants.

Location of Jobs

We believe that MIS graduates, rather than Computer Science graduates, should have an advantage in filling IS-oriented jobs in user departments, based on their knowledge of business and on their communication skills. Therefore, we were particularly interested to find out how many and what type of IS jobs were located in user departments. The results from the overall and the telephone study are shown in Table 2.

From the two sets of data, we see that organizations with IS jobs almost always have a central IS department. Almost half of these organizations are reporting IS jobs in user departments (46% in the overall study, 44% in the telephone study).

Figure 1 displays the distribution of IS jobs in user departments from the overall study. These data represent the number of times a department is mentioned as hiring IS people, not the number of actual jobs. For this sample, the departments hiring most often are Finance, Accounting and Marketing.

Entry-Level Job Types

After careful analysis of the telephone and ad data, four types of entry-level

TABLE 1 Typical CIS/MIS Curriculum

COBOL I	DSS/ES/ESS/NN
COBOL II	IS Concepts
Computer Concepts	IS Projects
DBMS Concepts I	Management of IS
Data Communications	Microcomputer Applications
Data/File Structure	Systems Analysis and Design

TABLE 2 Location of IS Job-types Within Organizations

	No. of Orgs.	No. of Orgs. Having IS Jobs	In IS Dept	In User Depts
Overall Study	107	102, 95% of the total	98 out of 102 = 96%	49/102 = 42%
Telephone Study	40	34 had entry level IS jobs, 85% of the total	34 out of 34 = 100%	15/34 = 44%

jobs were identified: programmer, analyst, user support, and technical support. This finding departs slightly from Nelson [1], in that his study identified only one type of support job, "user support". We found a distinction between the user support position, which was desktop software and application- oriented, and the technical support job, which was PC hardware, LAN, and systems-software oriented. This finding may reflect the recent emphasis on distributed hardware and networks in organizations and may explain why Todd et al. [5] report that recent job ads include more references to technology than do ads from 10 and 15 years ago.

The following two sections discuss job types as they relate to job location - IS department and user department. The telephone study was able to distinguish between jobs in IS departments and those in user departments, the ads study could not do so and all jobs were classified as IS-department jobs.

Jobs in IS Departments

Figure 2 shows the frequency of each type of job found in both telephone and ad studies. The telephone study results indicate that programmer and analyst are the best established job types. However, the ads study revealed that technical support and programmer jobs were the most prevalent entry-level job openings in the market during the time period surveyed.

Jobs in User Departments

The job types in user departments are shown in Figure 3. Although this is a very small sample, one can see a different distribution of job types—with a higher percentage of support and analyst jobs and a lower percentage of programmer job types. Perhaps pure programmer and programmer analyst jobs are confined to the IS department. The support jobs were all user support, rather than technical support. We suspect that the typical business graduate, skilled in problem solving, the use of desktop software, and possessing general business knowledge, would be likely to find employment in this environment.

Skills for Entry Level Jobs
As reported by Survey Respondents
Many previous studies [2, 7, 8, 9] have found that employers rate soft skills as having more value than technical skills. In the mid 1990s, with higher

FIGURE 1 Number of IS Jobs in Various User Departments

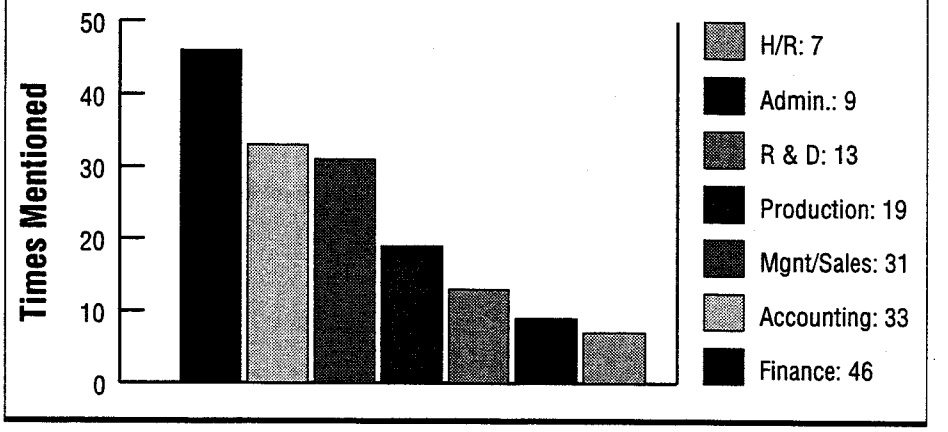


FIGURE 2 Percent of Each Job Type in the IS Department

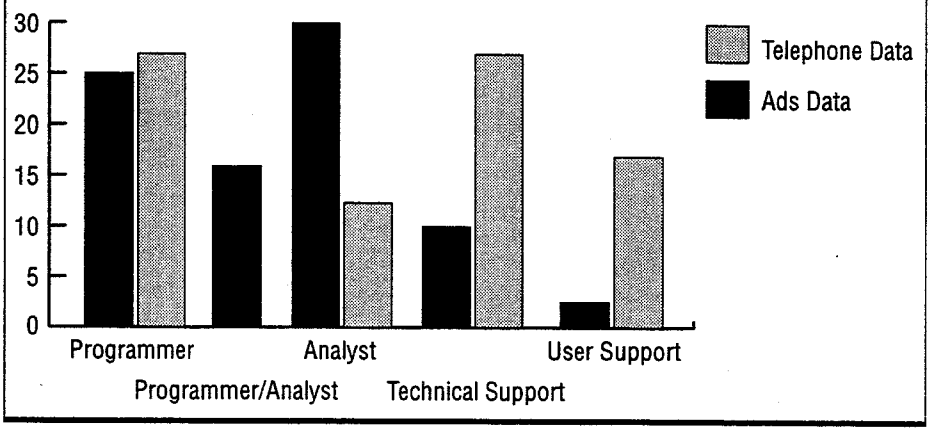
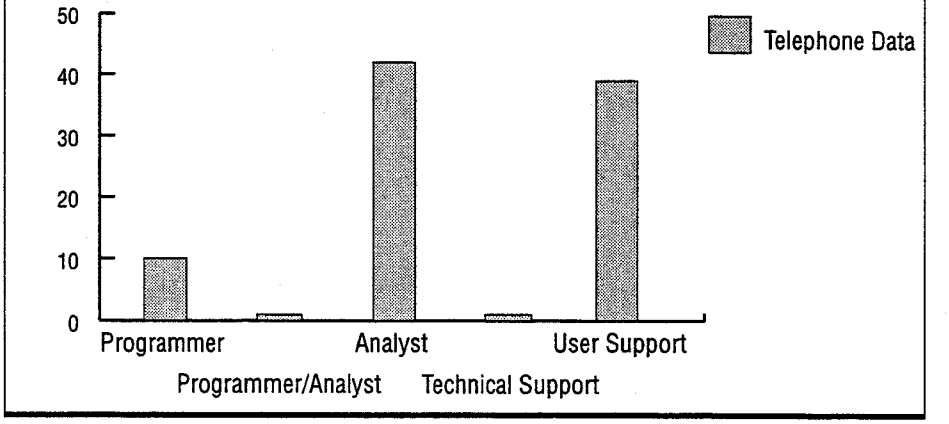


FIGURE 3 Percent of Each Job Type in the User Department



and higher levels of technical complexity, we wondered if this trend would continue. Accordingly, a question in the overall study (n=107) asked the respondents to rate (out of 6 on a Likert scale) the importance of various attributes of entry-level employees. The results are shown in Table 3. The double lines denote statistically significant differences in the score.

An interesting finding is the significantly higher rating given to "Ability to grown and develop" than to "Match with current job," indicating that potential may be more important than immediately usable skills As one IS manager said "Organizations are looking for individuals who pick things up easily. Forget about technical skills, they are the easiest to acquire. Focus on business skills, interpersonal skills, communication skills, and attitude."

The telephone study asked employers to name the three most important screening criteria used when hiring entry-level people. The top three were: communication skills, academic performance, and previous work experience.

When asked to identify the role that previous experience plays in the hiring decision, 31% of employers reported placing a weight of at least 60% on this criteria. Another 38% reported weighting between 30 and 60% of their decision on this criteria.

As Shown in Job Advertisements

We were interested in determining if the ads indicated the stated preference for soft skills or emphasized technical knowledge and specific software packages. Figure 4 shows how often ads mentioned various characteristics as being mandatory or very important to the job.

We can see from this data that ads are mentioning both hard and soft skills. However, 1/3 of the jobs mention a specific programming language as being mandatory, thereby indicating to prospective applicants that their general programming skills will not be sufficient. Although employers in conversation talked about general business knowledge as being important, the ads do not support their statements. In general, the ads do not welcome a business graduate with an MIS major unless they have previous experience or training on the right platform and technology.

CONCLUSIONS

This section contains conclusions and recommendations with respect to preparation for typical entry-level jobs and areas for future research.

Job Types and Curriculum

In Table 4, the findings of this research are summarized by noting courses, skills, and supplementary study that might be appropriate for each major category of entry level jobs.

Given the research findings, an MIS curriculum should include the following IS-related subject areas to meet the needs of the workplace:

- IS opportunity identification in different business environments
- Information requirements and cost/benefit analysis
- Systems analysis (including data, process,and object modeling)
- 3GL programming
- SQL coding and database construction
- Data communications theory with hands on administration of a LAN
- Decision support - model building and advanced use of spreadsheets
- 4GL programming and Object oriented programming and coding for the Internet
- An applied project course or modules
- IS management theory and cases

The MIS curriculum in many business faculties cannot provide this number of courses due to limited staff complements. Some solutions may be to direct MIS students to Computer Science and other technical schools for specific programming and technology courses and to set up a Joint Major and minor programs with Computer Science.

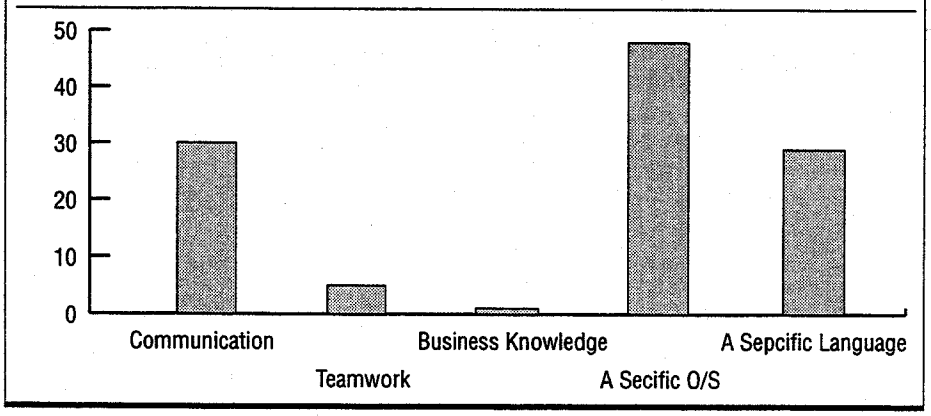
Preparation for Entry Level Jobs Within the IS Department

We have no doubt that a business grad entering the IS department as a junior programmer can progress into analyst and supervisory roles based on their soft skills and business knowledge, but they will first have to serve a technical apprenticeship period. Preparation for a job within IS might include taking 3 or more programming courses or getting several semesters of technical work experience. MIS faculty will need to counsel students and establish relationships with the computer science and technical schools in their area in order that the students can augment their program of study.

Within User Departments

Business graduates are most suited for jobs in user departments; jobs which require analysis, user support, and liaison skills. These are the jobs of the future - "hybrid" jobs which require flexibility, both technical and business understanding, and the ability to work effectively in teams. The difficulty is that these jobs are not easily identifiable

FIGURE 4 Percent of Times Manditory Items were Mentioned in Ads



and are often listed with a business area rather than an IS focus. For example, a junior marketing analyst job may list duties such as marketing project support. On inspection, however, the job might require MIS skills such as database access, spreadsheet creation, and report generation.

Because job postings and job classifications have not yet matured to the point where a set of generic positions are established, it may be up to faculty and placement departments to assist students in identifying the opportunities.

Developing the Softer Skills

In order to develop the student's ability to write, speak, and work in teams, SFU has incorporated the following requirements into each MIS course: a business report, at least one oral presentation, and a group project designed to teach the students about setting team norms, delegation, leadership, and conflict resolution.

Gaining IS Work Experience

Findings from all studies suggest that a student is better able to secure a job if he or she has had some relevant experience. If co-op programs are impractical, then the student or the school should arrange to supplement the courses with IS-related experience, whether it is a class project done for a local organization, a volunteer job, or self study and experimentation in new technologies. A small lab might be set aside for the MIS students to experiment under supervision. Partnerships with local organizations might be arranged so students can see innovative technical solutions in the workplace.

Developing Proactive Behavior

In our opinion, the student needs to understand that a set of courses do not constitute preparation for a job. By supplementing the courses with work experience, projects, student clubs, participation in professional organizations, and self study; students can take more control of their destiny, develop leadership skills, and push their institutions to meet their needs.

Future Research

Future research will need to be designed specifically to obtain a wider set of respondents and less rigid definition of job types to capture the full spectrum of IS-oriented jobs in user departments. Another area of future study could track the hiring process of IS managers in order to investigate how specific skill types are evaluated during hiring decisions. Although we have investigated jobs in medium sized organizations, there are many IS jobs in other domains—consulting firms, start-up companies, and small high tech firms. These may prove to be fertile ground for research.

SUMMARY

It has been said that a vision is a good motivator. It is our hope that this research will provide vision both for students, by showing them the variety of jobs available; and for faculty, by suggesting ways in which the gap between programs and entry-level work can be narrowed. Our expectation is that every proactive MIS graduate will find a good place to start a career, given the support of faculty members, MIS programs, and business schools.

REFERENCES

1 Nelson, R.R. *Educational Needs as Perceived by IS and End-User Personnel: A Survey of Knowledge and Skill Requirements*, MIS QUARTERLY, 15:4, December 1991, pp. 503-526.

2 Leitheiser, R.L., *MIS Skills for the 1990s: A Survey of MIS Managers' Perceptions*, JOURNAL OF MANAGEMENT INFORMATION SYSTEMS, 9:1, Summer, 1992, pp. 69-91.

3 Davis. D.B., *Cover Story: Management*, DATAMATION, January 15, 1993, pp. 29-32.

4 Trauth, E.M., Farwell, D.W., and Lee, D. *The IS Expectation Gap: Industry Expectations Versus Academic Preparation*, MIS QUARTERLY, 17:3, Sept 1993, pp. 293-303

5 Todd, P.A., McKeen, J.D., Gallupe, R.B., *The Evolution of IS Job Skills: A Content Analysis of Job Advertisements from 1970 to 1990*, MIS QUARTERLY, March 1995, pp. 1-27.

6 Watson, H.J., Young, D., Miranda, S., Robichaux, B., and Seerly, R., *Requisite Skills for New MIS Hires*, DATABASE, Spring, 1990, pp. 20-29.

7 Bell, J.D. and Richter, W.W., *Needed: Better Communication from Data Processors*, PERSONNEL, 63:5, May 1987, pp.20-26.

8 Albin, W. and Otto, R.W. *The CIS Curriculum: What Employers want from CIS and General Business Majors*, THE JOURNAL OF COMPUTER INFORMATION SYSTEMS, Summer, 1987, pp. 15-19.

9 Benbasat, I., Dexter,A.S., and Mantha,R.W., *Impact of Organizational Maturity on Information Systems Skill Needs*, MIS QUARTERLY, 4:1, March 1980, pp.21-34.

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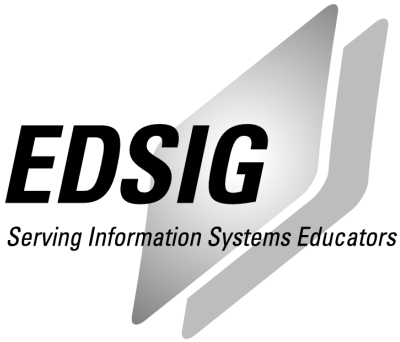

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