System Analysts' Job Skills Importance As Seen From The Eyes of IS Managers

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Abstract

Increasingly, systems analysts are expected to have behavioral and administrative skills as well as technical skills. This paper presents the results of 739 information systems (IS) mangers (220 responses) regarding the importance of various skills needed by systems analysts. The survey instrument skill items were gathered from those reported in previous similar studies.

I. Research Rational

During recent years, information systems have typically been designed by both users and systems analysts [Kaiser and Bostrom, 1982]. This approach contrasts sharply with previous system developments that were solely handled by the systems analyst. Numerous research works in the field of management information systems (MIS) have indicated a positive relationship between user involvement and information system (IS) effectiveness [Baronas and Louis, 1988; Baroudi, Olson, and Ives, 1986]. Thus, many believe that the development of useful and satisfactory information system requires a good working relationship between users and systems analysts. That is, successful system development efforts depend to a large degree upon how well systems analysts and users work together.

Over the past twenty years, articles from the highly rated MIS journals reveal several studies directed toward systems analysts' job skills needs and job skill

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identification instruments [Arvey and Hoyle, 1974; Benbasat, Dexter, and Mantha, 1980; Cheney and Dickson, 1982; Cheney and Lyons, 1980; Green, 1989; Henry, Dickson, and LaSalle, 1974; Kaiser and Bostrom, 1982; Vitalari, 1985]. Today's prevailing thought regarding the development of information systems is that heavy user participation results in better user satisfaction. As noted by Kaiser and Bostrom[1982], a major challenge to users and analysts in implementing information systems may be "integrating the strengths of complementary perspectives into their view" [Kaiser and Bostrom, 1982]. When users and analysts interact, non-technical, behavioral oriented skills are required of the analysts. Seemingly then, the increase in user-analyst interaction will lead to an increase in the need for non-technical skills by the systems analysts. However, questions remain regarding which skills are most important for the successful systems analysts.

At least three factors support the importance of renewed surveys relating to systems analysts' job skills. First, the increased involvement by a wide range of technology-wise diverse user groups in all phases of the systems development process leads to different analyst skill requirements. Second, presumed changing role of the analyst in various phases of the systems development process tied to the number of new technology-supported analysis and design tools indicates that analyst skill requirements may indeed be different today from that they were several years ago. Finally, the age of prior research efforts, coupled with their conflicting results, different survey instruments, and different target audiences leaves room for additional study.

II. Literature Review

In the previous literature, substantial emphasis has been given to the findings of perceived job skills of systems analysts based upon IS professionals' perceptions [Vitalari, 1985; Kaiser and Bostrom, 1982; Cheney and Lyons, 1980; Benbasat, Dexter, and Mantha, 1980]. These studies explored systems analysts' job skills requirement to build a successful system. To explore these skills, various instruments have been developed [Green, 1989; Vitalari, 1985; Kaiser and Bostrom, 1982; Kaiser and Srinivasan, 1982; Cheney and Lyons, 1980; Henry, Dickson, and LaSalle, 1974; Arvey and Hoyle, 1974; Strout, 1970].

As the first empirical finding of skill studies, Strout's 98 items are representative variables used to find skills to accomplish successful performance in systems development. Although there has been some modification of the original Strout items, numerous studies [Kaiser and Srinivasan, 1982; Benbasat, Dexter, and Mantha, 1980;

Alloway, 1980; Cheney and Lyons, 1980; Arvey and Hoyle, 1974; Henry, Dickson, and LaSalle, 1974] adopted the items to identify the job skills required to accomplish successful performance in system development. For instance, Cheney and Lyons [1980] identified 26 items and Arvey and Hoyle [1974] produced 12 major dimensions of the systems analysts' job skills from the previous studies.

The most comprehensive study of job skills for systems analysts was completed by Vitalari [1985], who identified 23 specific skills categorized as organizational specific knowledge, applications domain knowledge, functional domain knowledge, and technical skills.

Recently, Green [1989] identified with validity test 21 different behavioral and technical skills for information systems analysts. Table 1 summarizes the variables used more than twice in the systems analysts' job skills studies.

III. Target Audience and Instrument

As with some prior studies, [Benbasat, Dexter, and Mantha, 1980; Cheney and Lyons,. 1980], the target audience for this study was IS managers. Standard and Poor's Register of Corporations, Directors and Executives, which provides an alphabetical listing of more than 50,000 corporations, was used to identify the IS managers. A systematic sampling process of one subject organization from every other page of the register was used to obtain the names and addresses of the IS managers and yielded 739 organizations (all listed organizations do not include IS manager listings).

The instrument used in this survey was based on questions used in previous studies. Although some refinement was necessary, the instrument included, in a similar fashion, 25 items identified and used at least twice in prior studies. The surveys along with an explanation letter and return envelope were individually addressed to the 739 IS managers. Respondents were asked to rate the importance of the 25 items on a 7-point scale (7=strongly agree).

IV. Results

A response rate of 29.5% (220/739) was achieved. The relatively high response rate probably results from the use the IS manager's name on the envelope and inside

Table 1. List of Variables Used in the Previous Studies

Variables	Frequency & Source*
1. Having a broad view of organizational goal & objective	2(f,g)
2. Knowledge about the functional organizational structure	2(b,f)
3. Knowledge about the interdepartmental relationship	1 (f)
4. Knowledge about types of human behavior occurring in the org.	3(b,f,g)
5. Skill of assessing users' needs and problem	7(a,b,c,d,e,f,g)
6. Skill communication & interaction with users	7(a,b,c,d,e,f,g)
7. Listening(paying attention to & concentrating on what is being said)	1(g)
8. Interview skill(ability to ask the right questions to obtain the information needs	2(f,g)
9. Skill of persuading others	3(b,f,g)
10. Cooperation(working with others productively)	1(g)
11. Conducting presentation to users	2(b,g)
12. Non-verbal communication skill(gestures & facial expression)	1(g)
13. Clear attitude(answer yes or no clearly)	1(g)
14. User training skill	4(a,b,f,g)
15. Skill of preparing documentation that accurately communicates	5(a,b,c,f,g)
16. Skill of providing recommendation to programmers and support staff	2(a,g)
17. Providing supervision and leadership(effectively giving rewards & punishment)	2(a,g)
18. Skill to handle conflicts about procedures	1(g)
19. Skill about planning, organizing, and scheduling of projects	3(b,f,g)
20. Skill of system problem analysis	7(a,b,c,d,e,f,g)
21. System design skill	7(a,b,c,d,e,f,g)
22. Skill about the various types of functional requirements of information systems	2(f,g)
23. File design skill	3(b,c,f)
24. Programming(coding) ability	7(a,b,c,d,e,f,g)
25. Debugging ability	3(a,b,c)
26. Hardware knowledge employed to implement information systems	5(a,b,c,e,f)
27. Error control skill within system	3(b,c,f)
28. Target functional area knowledge	3(b,f,g)

Note: * a: Arvey and Hoyle, 1974
       b: Benbasat, Dexter, and Mantha, 1980
       c: Cheney and Lyons, 1980
       d: Kaiser and King, 1982
       e: Kaiser and Srinivasan, 1982
       f: Vitalari, 1985
       g: Green, 1989

letter, and the perceived importance of the topic area to IS ma nagers (see Table 2).

Several findings uncovered in the descriptive statistics are of interest. First, those skills exhibiting a mean rating below 5.0 on the 7-point scale were programming skills, debugging skills, hardware knowledge, and supervision and leadership skills (see Table 3). Two comments are appropriate here. 1) The skil ls which can best be classified as technical (programming, debugging, and hardware knowledge) exhibit ratings lower than all but one of the other listed skills. These ratings are also lower than those received in prior studies, thus indicating a definite decrease in the importance that information systems managers place on the technical skill needs of systems analysts. 2) The relative low rating of the importance of the supervision and leadership skills may be the result of two factors: IS manager respondents considered themselves to be the primary supervisors or leaders; and/or these skills are simply not as important, given the presumed increasing role of coordination and decreasing role of leading subordinates, (programmers) in their work. An aside explanation for this last reason is that technology tools such as higher-level languages and workbenches have created programming jobs that require less supervision.

Another view of the skill needs analysis flows from those five skills rated higher than 6.5 on the 7-point scale (see Table 4). In rank order, these skills are: listening skill, problem analysis skill, interview skill, user need and problem assessment skill, and communication and interaction skill. Here the skills identified are clearly oriented away from the baseline level technical skills. Note also that the skills are mainly needed in the analysis phase of systems development efforts. Seemingly, IS managers assume that technical skills are possessed at other levels of their organizations or can be gathered from outside sources.

V. Conclusions

The job of a systems analyst requires a wide array of s kills which vary on a continuum from technical to behavioral and administrative. Previous published research has produced conflicting results regarding the relative importance of these skills. While several factors, both internal and external to the organization, may dictate different importance levels of these skills for an individual systems analyst, it seems clear that today's U.S. IS managers view behavioral skills as more important than technical skills.

Table 2. Demographics of Respondents

A.	Sex	IS[*]
	Male	188(85.5)
	Female	28(12.7)
	Missing	4(1.8)
	Total	220(100.0)

B.	Highest Education	
	High School	40(16.2)
	College	124(56.2)
	Graduate School	54(24.5)
	Missing	2(0.9)
	Total	220(100.0)

C.	Age	
	Less 25	3(1.4)
	26 - 30	9(4.1)
	31 - 35	19(8.6)
	36 - 40	34(15.5)
	41 - 50	96(43.5)
	51 - 55	34(15.5)
	Over 56	22(10.0)
	Missing	3(1.4)
	Total	220(100.0)

D.	Years with Current Organization	
	Less 3	29(13.1)
	3 - 7	45(20.5)
	8 Over	146(66.4)
	Total	220(100.0)

E.	Years in Current Position	
	Less 3	46(21.0)
	3 - 7	74(33.6)
	8 Over	100(45.4)
	Total	220(100.0)

Note: [*] Information Systems Department

Table 3. Descriptive Statistics for The 25 Systems Analysts' Job Skills
from The Information Systems Managers' Perception

Item(Variable description used in computer output)	Mean[*]	Std. Dev.
1. Broad view of organizational goals & objectives	6.24	.92
2. Knowledge about the functional organizational structure	5.98	1.02
3. Knowledge about the interdepartment relationships	6.10	.97
4. Knowledge about types of human behavior in organization	5.25	1.07
5. User need and problem assessment skill	6.66	.62
6. Communication and interaction skill	6.62	.74
7. Listening skill	6.80	.45
8. Interview skill	6.71	.54
9. Persuasion skill	5.45	1.07
10. Cooperation skill	6.45	.71
11. Presentation skill	5.92	.94
12. User training skill	5.59	1.15
13. Documentation preparation skill	5.84	1.03
14. Recommendation to programmers & support staff	5.76	1.17
15. Supervision and leadership skill	4.78	1.38
16. Conflict resolution skill	5.71	1.19
17. Planning, organizing, and scheduling skill	6.25	1.08
18. Problem analysis skill	6.25	.68
19. System design skill	6.60	.71
20. Functional requirements identification skill	6.35	.92
21. Data structure design skill	5.76	1.20
22. Programming skill	4.95	1.39
23. Debugging skill	4.95	1.39
24. Hardware knowledge	4.89	1.36
25. Knowledge about the target functional area	5.79	1.29

Note: [*] on a scale of 1 (Strongly Disagree) to 7(Strongly Agree)

Table 4. Comparison of Findings: Green's Study vs. Current Study

Rank	Green(1989)		Current Study
	Users	Systems Analysts	IS Managers
1.	Directing	Directing	Listening
2.	Speaking	Speaking	Problem analysis
3.	Training	Diplomacy	Interview
4.	Programming	Politics	User need and Problem assessment
5.	Diplomacy	Politics	Communication and Interactive

purchased rather than made software, the threat of external providers of information services, the increasing role of users in the systems development process, and the increasing number of technology-supported tools for all phases of the systems development life cycle.

Additional study will be required to trap with certainty the reasons for the pronounced shift in the relative importance of the skills, but the existence of such a shift cannot be denied. The most important skills identified in this study: listening skill, problem analysis skill, interview skill, user need and problem assessment skill, and communication and interaction skill indicate what should be current teaching strategies for academic institutions and training programs.

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