Journal of Information Systems Education

Spring 1995

A Managerial Perspective On The Information Technology Needs Of End-Users

ABSTRACT: The advancement in Information Technology (IT) has brought a tremendous impact on End-User Computing (EUC). Many organizations have partially decentralized information systems, and functional area managements are being held accountable for effective utilization of IT. This study investigates IT knowledge and skills which functional area managers identify as important for end-users. Since information systems managers' views are also important, their perceptions are compared with non-information systems functional area managers' perceptions. Results of this study suggest specific IT topics that business graduates should know and be able to apply. The topics identified should receive the most emphasis in the MIS curriculum for all business majors.

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KEYWORDS: *Curriculum; End-User; Information Systems*

INTRODUCTION

Effective utilization of Information Technology (IT) has become a critical ingredient of corporate management at all organizational levels. IT has become an integral component in corporate strategies designed to achieve a competitive advantage, in tactical strategies developed to accomplish corporate missions and goals, and in day-to-day operations strategies. As a result, IT has brought an immense impact on End-User Computing (EUC). End-users need IT knowledge and skills necessary not only for utilizing, but also for managing and evaluating IT in the organization. The IT knowledge and skill requirements for end-users presents a tremendous challenge to MIS academicians and business schools. Business schools must design an MIS curriculum that enables tomorrow's end-users to acquire the knowledge and skills necessary to effectively utilize and integrate IT.

There has been considerable discussion about the IT content areas that business schools should provide for business majors. Academicians, business leaders, and practitioner magazines suggest that business school curricula are poorly focused and may have become irrelevant [9]. Some of this irrelevancy is most likely due to an inadequate consideration of the IT knowledge and skills expectations of functional area managers. Numerous studies have addressed introductory MIS courses and computer literacy [3, 4, 6, 7, 11, 23], but there are very few studies which examine the IT needs of end-users from managerial perspective [26].

This study identifies the IT knowledge and skills that information systems (IS) and non-information systems (NIS) functional area managers perceive to be most important for business school graduates. IS area managers' views are important and included because of:

1. The experiences they have had in developing, implementing and maintaining information systems, and
2. The support they have provided end-user personnel.

The findings of this study should enable MIS academicians to more effectively design MIS curriculum for all business school graduates.

PURPOSE OF THE STUDY

EUC has influenced IS and NIS managers in various ways. From the perspectives of NIS managers, EUC has brought substantial benefits such as end-users' increased control over their information and improved decision effectiveness. On the other hand, EUC has brought some problems and risks from the perspectives of IS managers. For example, EUC has often resulted in mistakes in logic, unreliable output, and overall lack of comprehensibility [2]. These problems might have been caused by the lack of skills of end-users in information requirements and in analysis techniques [2].

The primary objective of this study is to identify the IT topics perceived by IS and NIS managers to be most important for business school graduates and compare them. More specifically, the study addresses the following research questions:

1. What are the most important and least important IT topics for business school graduates as perceived by managers in all functional areas?
2. Does the perceived importance of specific IT topics differ between Information Systems (IS) and Non-Information System (NIS)—accounting, finance,marketing/sales, personnel, operations management—managers?

RESEARCH DESIGN AND METHODOLOGY

Survey Instrument

Many business schools have taken an incremental approach in developing the MIS curriculum for all business school graduates; schools initially started with a set of content areas and added areas as IT evolved. Thus, the actual content of the MIS curriculum for all business school graduates varies widely from campus to campus and may not include a common set of IT topics.

Numerous IT topics are presented in MIS instructional materials. These topics include: computer hardware, software, impact, telecommunication, system design, productivity software packages,and information systems. In addition, MIS academicians suggest that IT topics should include: end-user systems development, the strategic application of IT, IT planning, and IT evaluation [2,14, 15, 20, 26, 28]. Current IT instructional materials and the research literature were used to construct the list of 27 IT topics included in the survey instrument. A 10-point Likert scale ranging from 1 = "unimportant" to 10 = "very important" was used to identify the perceived importance of the topics. The 27 IT topics used in the survey are listed in Table 1.

Participants

Participants were managers working in eleven organizations in seven industries (finance,manufacturing, meat processing, oil, retailing, transportation, and insurance). These organizations were regular recruiters of the graduates of a midwestern university, and thus the sample was a convenience one. All organizations had 4000 or more employees. Data collection was done by mail survey. Of the 250 questionnaires mailed, 108 were returned (a response rate of 43 percent). Among those who participated, 28 were IS managers; 80 were NIS managers. Of the 80 NIS managers, 46 were from the functional area of accounting, ten were from finance, nine were from personnel, eight were from marketing/sales, and seven were from operations management.

RESULTS

Perceived Importance of the IT Topics For all Managers

To address the first research question, what are the most important and least important IT topics for business school graduates as perceived by all functional area managers, the mean perceived importance for each IT topic was calculated. The IT topic means, ranked from highest (most important) to lowest (least important), are given in Table 2.

Five topics emerged as most important:

1. database concepts and principles from a user perspective
2. application knowledge of mainframe access through terminal
3. file concepts and file organization techniques,
4. application knowledge of spreadsheet packages
5. application knowledge of database management packages

The topics considered to be least important included:

1. application knowledge of UNIX
2. application knowledge of BASIC programming
3. modeling concepts-formulating mathematical models
4. computer hardware components
5. expert systems

Perceived Importance of the IT Topics for IS vs. NIS Managers

To address the second research question, whether differences in perceived importance of specific IT topics exist between IS and NIS managers, the mean perceived importance was calculated for each IT topic for the IS and NIS managers. Analysis of variance was used to compare the IS and NIS means using the SAS [21] statistical package. The IT topics where significant differences in mean importance between the IS and NIS managers occurred are listed in Table 2.

Table 1. LITERACY TOPICS

1. Computer hardware components including CPU, I/O, storage
2. Operating systems software and concepts
3. File concepts and file organization techniques
4. Telecommunications and distributed computing concepts
5. Decision support systems
6. Expert systems
7. Executive information systems
8. Database concepts and principles from a user perspective
9. Modeling concept (formulating mathematical models)
10. Feasibility study for system development
11. System analysis and design
12. Software package evaluation
13. Information system evaluation
14. Strategic application of information technology
15. Information system planning
16. The role of information system in organization
17. Computer security, crime, ethics, and the law
18. Impact of computers on people and organizations
19. Career opportunities in information processing
20. Application knowledge of word processing packages
21. Application knowledge of spreadsheet packages
22. Application knowledge of database management packages
23. Application knowledge of BASIC programming
24. Application knowledge of MS/DOS commands
25. Application knowledge of UNIX
26. Application knowledge of local area network (LAN)
27. Application knowledge of mainframe access through terminal (TSO, CMS, etc).

The most important topics for non IS managers were:

1. Application knowledge of spreadsheet packages,
2. Database concepts and principles
3. Application knowledge of mainframe access
4. Application knowledge of database management packages
5. Application knowledge of word processing packages
6. File concepts and file organization techniques

The next important topic category for NIS managers include computer security, the role of information system in organization, strategic application of information technology, operating systems software and concepts, and application knowledge of MS/DOS commands.

The most important topics for IS managers were:

1. System analysis and design
2. Database concepts and principles
3. File concepts and file organization techniques
4. Information system planning
5. The role of information system in organization
6. Strategic application of IS
7. Telecommunication

The next important topic category for IS managers include feasibility study for system development, decision support systems, mainframe access, and application knowledge of database management packages. The ranking of topics by two groups of managers are listed in columns 2 and 3 in Table 2.

When overall means and rankings for all managers are examined, IS and NIS managers agreed on the importance of three of the five most important IT topics:

1. database concepts
2. mainframe access
3. database application

They also agreed on other topics of less importance including impact of computers, computer security, and operating systems software.

On the other hand, IS and NIS managers disagreed on many other topics. The thirteen [13] topics yielding significant differences in perceived importance are presented in Table 2. For one of the five most important topics, file concepts, IS managers rated the topic as more important than did NIS managers. For another of the five most important topics, spreadsheet application was viewed as much more important by NIS managers. They also disagreed on the topics including systems analysis and design, information systems planning, telecommunications and distributed computing concepts,

Table 2. PERCEIVED IMPORTANCE OF INFORMATION TECHNOLOGY TOPICS RANKED BY MEAN FOR ALL MANAGERS AND THE CORRESPONDING MEANS FOR INFORMATION SYSTEMS (IS) AND NON-INFORMATION SYSTEMS (NIS) MANAGERS

Information Technology Topic	Mean Perceived Importance[a]		
	All Managers	IS	NIS
Database concepts and principles from a user perspective	7.9	8.4	7.7
Application knowledge of mainframe access through terminal (TSO, CMS, etc.)	7.4	7.2	7.5
File concepts and file organization techniques	7.3	8.3	7.0[c]
Application knowledge of spreadsheet packages	7.3	5.3	8.0[b]
Application knowledge of database management packages	7.1	7.0	7.1
The role of information system in organization	6.8	7.7	6.4[b]
Impact of computers on people and organizations	6.7	6.7	6.6
Application knowledge of word processing packages	6.7	5.4	7.1[b]
System analysis and design	6.6	8.5	6.0[b]
Strategic application of information technology	6.6	7.5	6.3[c]
Computer security, crime, ethics, and the law	6.6	6.8	6.5
Information system planning	6.4	8.0	5.8[b]
Telecommunications and distributed computing concepts	6.4	7.5	6.0[b]
Decision support systems	6.3	7.3	6.0[b]
Operating systems software and concepts	6.2	5.8	6.3
Feasibility study for system development	6.1	7.4	5.7[b]
Executive information systems	6.1	6.3	6.1
Application knowledge of MS/DOS commands	6.1	5.4	6.3
Information system evaluation	6.0	6.6	5.9
Application knowledge of local area network (LAN)	6.0	5.9	6.0
Software package evaluation	5.9	5.6	6.0
Career opportunities in information processing	5.5	6.0	5.3
Expert systems	5.4	6.1	5.1[c]
Computer hardware components including CPU, I/O, storage	5.2	6.1	4.8[c]
Modeling concept (formulating mathematical models)	5.1	5.4	4.9
Application knowledge of BASIC programming	4.4	3.0	4.9[b]
Application knowledge of UNIX	3.7	4.0	3.6

[a] 10=very important, 1=unimportant
[b] IS and NIS means differ at p<.01
[c] IS and NIS means differ at p<.05

feasibility study, decision support systems, expert systems, and computer hardware components. For 10 of the 13 topics, the IS managers perceived those topics to be more important than the NIS managers. NIS managers put higher rating than IS managers on spread sheet application, word processing, and MS/DOS knowledge.

DISCUSSION

MIS education for business majors has become a critical task for business schools. For years, business schools have applied significant resources and effort to the development of the MIS curriculum required of all business graduates. While many studies have examined MIS topics and strategies, very few have attempted to examine the needs and perspectives of managers by functional areas. In addition, the IT topics investigated have typically been limited to different types of software.

As Rockart and Flannery [19] reported, end-users, because of the diversity in end-user types and capabilities as well as different functional needs, are utilizing various data analysis tools. The results of this study show that both IS and NIS managers consider the topic of data base concepts and principles to be the important topic. Managers also consider file concepts and file organization techniques important. In addition, NIS Managers consider an application knowledge of mainframe access to be very important. Corporate data bases continue to be one of the most important assets in organizations, and it is necessary for end-users to frequently access a mainframe via a database management system to analyze information and make decisions. Hence, a knowledge of database concepts and the ability to utilize database seems very important.

The application knowledge of spreadsheet packages was identified as the most important topic by NIS managers. In addition, NIS managers consider the application knowledge of database management packages topic to be one of the five most important topics. NIS managers also continue to view the ability to utilize word processing software as essential. Business school graduates should certainly have the knowledge and the skills associated with productivity packages.

The impact of computers on people and organizations, system analysis and design, strategic application of IT, telecommunications and distributed computer processing, and IT planning are also important IT topics. On all of these topics, IS managers put higher rating than NIS managers did.

Of significance are those topics considered to be least important. The application knowledge of Unix topic is not considered important, ranked last and second to last in importance by NIS and IS managers, perhaps because the companies investigated do not use this operating system. Generally, the application knowledge of BASIC programming topic was not considered important in overall mean rankings and by mean rankings by IS and NIS managers.

However, it is interesting to note that NIS managers viewed it to be more important than did IS managers. The computer hardware components topic is also not considered important, especially by the NIS managers, perhaps because managers already know the basic concepts fairly well and/or feel they do not need this knowledge to perform their everyday computer-related jobs.

CONCLUSIONS

In summary, the study results suggest the importance of IT topics in the MIS curriculum for all business school graduates as perceived by NIS (accounting, finance, marketing/sales, operations management, and personnel) and IS managers. Considerable emphasis should be placed on:

1. data base principles and concepts as well as file concepts and file organization,
2. mainframe access, including telecommunications and distributed computing concepts,
3. application knowledge of spreadsheet, database management system, and word processing packages,
4. strategic application of IT, including IT planning and evaluation, and
5. analysis and design techniques for end-user systems development and participation.

There are differences in the importance that IS managers and NIS managers place on IT topics. For example, NIS managers view an application knowledge of word processing and spreadsheet software packages to be more important than IS managers. On the other hand, IS managers attached greater importance in system planning and development areas as well as in various information systems. It is essential that MIS academicians acknowledge and accommodate these differing perspectives as the MIS curriculum is structured and developed. One means of the accommodation can be through the integration of the topics. For instance, system analysis concepts can be

incorporated in the teaching of database concepts and packages. Strategic IS planning and IS evaluation can be incorporated with the assignments of spreadsheet and reports which use word processing software.

Finally, this study examined relatively large size companies from a convenience sample. The examination of smaller size companies from different types of sample smay render a different set of results. In addition, there may be a response bias; the more active users might have participated more than non-active users. However, since we believe that the active users supply more accurate responses, this should not hamper the study results.

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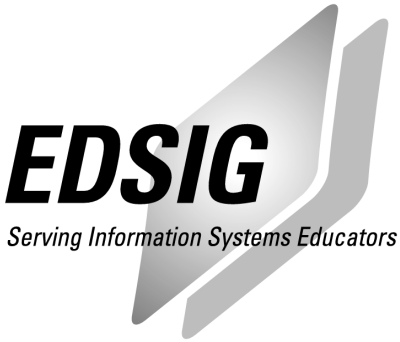

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ISSN 1055-3096