

Computer Knowledge Requirements for Accountants: A Survey of Fortune 500 Controllers

Daniel E. O'Leary, Ph.D., CPA, CDP

ABSTRACT A survey of Fortune 500 controllers was made to determine the computer knowledge that they felt accountants should have. This survey supplements previous theoretical frameworks proposed for determining the content in accounting computer courses and the recent *Report of the AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems* by providing an empirical study of the importance of particular types of computer knowledge for accountants.

The survey found that virtually all the controllers felt a working knowledge of personal computers was required and about 50 percent of the controllers felt that a working knowledge of mainframe and minicomputers was required. The survey also found that the relative importance of eight types of personal computer software ranked as follows beginning with the most important: spreadsheets, general ledger/accounting systems, database systems, communications, graphics, operating systems, word processing, and programming languages.

Introduction

Recently, the *Report of AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems* [Mock et al., 1986] discussed

Daniel E. O'Leary is Assistant Professor of Accounting, University of Southern California, Los Angeles, California. The following is Working Paper No. 103, Center for Accounting Research, School of Accounting, University of Southern California, and may not be quoted without the author's permission. Comments are solicited.

The author would like to thank graduate students Eilen Kuida and Melissa Wilmoth for gathering the addresses of the Fortune 500 controllers and for helping with the development of the questionnaire. The author also would like to thank Rajvi Berry for her help in compiling the data from the responses.

the curriculum design required to prepare students for the use, design, evaluation, and audit of accounting information systems. In addition, recent research has focused on developing frameworks for the integration of the computer into accounting education, for example, Armitage and Boritz [1986] and Helmi [1986]. However, there has been limited empirical research to supplement this theoretical work. To that end, this paper summarizes the results of a survey of Fortune 500 controllers' views of the computer knowledge requirements for accountants.

This survey was motivated by the desire to ascertain the relative importance of computing environments (for example, personal computers) and of computer applications (for example, spreadsheets) in order to guide the development of the content of an initial, undergraduate accounting information systems course.

This paper proceeds as follows. The next section of the paper discusses previous research. Then the third section reviews this survey. The fourth section summarizes the findings. The fifth section compares the findings to a previous, related study. The sixth section provides an analysis of some of the implications for course content in accounting information systems courses. The final section provides a brief summary of the paper.

Previous Research

There have been several empirical studies aimed at determining the extent of personal computer and software use. For example, Golden and Golden [1984] reported that 50 percent of accounting firms are using spreadsheets in audit work. However, there has been only one empirical study aimed at analyzing the accounting educational needs derived from the personal computer software environment.

In 1984, Waller and Gallun [1985] surveyed all of the "Big 8" accounting firms in Houston, fifteen non-Big 8 accounting firms in Houston, and thirteen industrial firms in Houston to analyze (among other things) the desired range of knowledge or skills and the desired depth of coverage of personal computer software these firms seek in candidates for employment. Unfortunately, the study had a number of limitations (many of which were pointed out by the authors) that affect current faculties' abilities to make course content decisions based on their findings.

Those limitations included the following. First, the study was conducted in 1984, prior to the current market penetration of personal computers. Thus, educational requirements of today are likely to have changed since that study was performed. Second, only firms located in Houston were surveyed. Thus, there may have been a geographical bias. Third, the sample sizes of the individual categories (eight, thirteen, and fifteen, respectively) were so small that it is dangerous to make wide-ranging assertions about the findings. And, last, the authors were unclear as to who were the desired respondents in their study.

This Survey

The research design of this survey was aimed at mitigating some of the limitations of the Waller and Gallun paper. Accordingly, it was performed at a time when personal computers had become a household word rather than a curiosity; the respondents to the survey were from all over the country rather than just one location; and the sample size of the survey was substantially increased. Further, rather than a survey based on an apparently arbitrary thirteen industrial firms, the survey was sent to the Fortune 500. Finally, in order to ensure a response that represented management's expectations, the survey was sent to controllers.

The Questionnaire

The questionnaire was aimed at soliciting from the controllers the level of knowledge required from potential employees about particular computing environments and individual types of software. The questionnaire addressed three different computing environments: mainframe, minicomputer, and personal computer. The questionnaire also addressed eight different types of software: spreadsheets, general ledger/accounting systems, data-base systems, communications, graphics, operating systems, word processing, and programming languages. The portion of the questionnaire aimed at gathering information about computer knowledge is given in Exhibit 1.

The three types of computer environments addressed provided a comprehensive set of computer alternatives available to accountants. The other environment, super-computers such as those systems manufactured by Cray, are not employed by accountants at even the largest companies.

The eight types of personal computer software listed in the questionnaire also provided a comprehensive set of software alternatives likely to be taught in accounting information systems classes on personal computers.¹ Each of these types of software is itemized in Mock et al. as elements of the expected coverage in prerequisite courses and minimal coverage in the accounting information systems course.

¹Other types of software that were not included in the survey were EDP audit packages, tax software, artificial intelligence software, external data bases (e.g., NAARS), financial planning packages, and statistical packages. EDP auditing packages were not included because these are used by auditors and not likely to be used by controllers. Tax software, external data bases, and statistical packages were not included in the survey because of the interest in determining the content of an accounting information systems course. Artificial intelligence software was not included because of the potential lack of knowledge of artificial intelligence by the respondents. Financial planning software was not included because virtually all such software for the personal computer is of a spreadsheet format.

EXHIBIT 1 The questionnaire

Working in the controllership area, we are sure that you have some ideas about the requirements for the future controller. Based on your expectations about future functions, changes, etc., what qualifications would you look for in a potential controller? Please check the appropriate boxes.

COMPUTER KNOWLEDGE

	<i>In-depth knowledge</i>	<i>Working knowledge</i>	<i>Overview knowledge</i>	<i>No knowledge</i>
Mainframe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minicomputer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PERSONAL COMPUTER KNOWLEDGE

	<i>In-depth knowledge</i>	<i>Working knowledge</i>	<i>Overview knowledge</i>	<i>No knowledge</i>
Operating systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data-base systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Word processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General ledger/ accounting systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Programming languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spreadsheets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Respondents

The survey was sent directly to the controllers of the Fortune 500 of 1985. If there was insufficient information to determine the name and location of the controller, the survey was sent to the chief financial officer. A summary of the job titles of the respondents is given in Exhibit 2.

A total of 95 completed responses out of 500 possible responses was received from one initial mailing and one follow-up mailing of the survey. The questionnaire was sent out initially in May 1986 and the follow-up was sent in September 1986.

The Findings

The results of the survey are summarized in Exhibits 3, 4, and 5. The results of the survey indicate that virtually all the respondents foresee a need for

EXHIBIT 2
Job titles of respondents

JOB TITLE	PERCENTAGE OF RESPONDENTS
Vice President/Controller	34%
Controller	20
Assistant Controller	12
Management Accountant	8
Treasurer	7
Vice President of Finance	5
Management Analyst	5
Finance Director	3
Vice President/Treasurer	3
Director of Accounting	2
Vice President/Accounting	1
Total	100%

at least a working knowledge of personal computers. However, it also is important to note that approximately 50 percent of the respondents suggested a working knowledge of mainframes and minicomputers. This likely is due to the location of the accounting system on the mainframe or large minicomputer.

An overview knowledge, at the least, was required with virtually all of the software. The percentage of respondents indicating that a particular type of software required at least overview knowledge ranged from 72 percent to 99 percent. The percentage of respondents indicating that a particular type of software required a working-depth knowledge ranged from 26 percent to 93 percent. Spreadsheets were regarded as the most important software: 93 percent of the respondents indicated that at least a working knowledge of spreadsheets would be desirable, whereas only 26 percent of the respondents indicated at least a working knowledge of programming languages.

EXHIBIT 3
Percentage of controllers ranking degree of knowledge required by type of computer

	IN-DEPTH KNOWLEDGE	WORKING KNOWLEDGE	OVERVIEW KNOWLEDGE	NO KNOWLEDGE
Mainframe	2	45	53	0
Minicomputer	1	53	45	1
Personal computer	40	55	5	0

EXHIBIT 4
Percentage of controllers ranking degree of knowledge required by type of software for personal computers

	IN-DEPTH KNOWLEDGE	WORKING KNOWLEDGE	OVERVIEW KNOWLEDGE	NO KNOWLEDGE
Spreadsheets	51	42	6	1
General ledger/ accounting	36	45	13	6
Data-base systems	8	56	35	1
Communications	12	48	37	3
Graphics	7	52	38	3
Operating systems	9	46	37	8
Word processing	3	40	46	11
Programming languages	2	24	46	28

Comparison to Previous Findings

The results of this study are substantially different from the Waller and Gallun survey of thirteen industrial firms. The differences occur in over half of the categories, including general ledger, communications, word processing, and programming. The differences are likely due to mitigation of the limitations as noted above, or they may be due to differences in the sizes of the firms surveyed, or things may simply have changed over the past two years. With the exception of general ledger, the current survey includes findings for those categories that are more similar to the findings for the Houston Big 8 survey. We would expect the controllers to be more concerned with general ledgers, whereas auditors would have less need for working-depth knowledge of general ledger packages.

The findings also proved to be consistent with the *Report of the AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems*.

Policy Implications of This Survey

The survey findings have a number of implications for software and hardware usage in an accounting information systems course. Consider the implications for education on personal computer software. First, knowledge about general ledger systems is an important issue. This suggests that general ledger systems should receive some "hands-on" experience. Second, with all the available software, there is temptation to drop computer programming from the course. However, these survey findings indicate that

EXHIBIT 5
Comparison of rankings of degrees of knowledge

	15 HOUSTON NON-BIG 8*	HOUSTON BIG 8*	13 HOUSTON INDUSTRIAL*	SAMPLE OF 95 FORTUNE 500
General ledger				
Working-depth	60	12	54	81
Overview	20	88	31	13
None	20	0	15	6
Data-base systems				
Working-depth	53	62	62	64
Overview	47	38	38	35
None	0	0	14	1
Communications				
Working-depth	20	50	16	60
Overview	67	50	76	37
None	13	0	8	3
Graphics				
Working-depth	13	50	54	59
Overview	67	38	38	38
None	20	12	8	3
Operating systems				
Working-depth	73	62	46	55
Overview	27	38	38	37
None	0	0	14	8
Word processing				
Working-depth	33	50	70	43
Overview	53	50	8	46
None	14	0	22	11
Programming				
Working-depth	33	37	53	26
Overview	20	38	31	46
None	47	25	16	28

*From Waller and Gallun (1985).

Summary

This paper has presented the results of a survey of Fortune 500 controllers. Studies such as this survey can be used in support of theoretical constructs, such as the *Report of the AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems*. In addition, the findings of this survey can be used to guide the development of course content and aid in the integration of the computer into accounting courses.

The survey found that virtually all controllers foresee the need for a working-depth knowledge of personal computers. In addition, the respondents indicated that accountants should have at least an overview knowledge of virtually all of the software packages on which the respondents were queried.

References

- Armitage, H. M., and J. E. Boritz, "Integrating Computers into the Accounting Curriculum," *Issues in Accounting Education* 1, no. 1 (AAA, Spring 1986): 86-101.
- Golden, M. R., and C. W. Golden, "Electronic Worksheets as an Audit Tool," *Journal of Accountancy* (April 1984): 38.
- Helmi, M., "Integrating the Microcomputer into Accounting Education—Approaches and Pitfalls," *Issues in Accounting Education* 1, no. 1 (AAA, Spring 1986): 102-111.
- Mock, T. J., B. E. Cushing, G. B. Davis, M. A. Vasarhelyi, C. E. White, and J. W. Wilkinson, *Report of the AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems* (May 1986, Revised July 1986 and September 1986).
- Waller, T. C., and R. A. Gallun, "Microcomputer Competency Requirements in the Accounting Industry: A Pilot Study," *Journal of Accounting Education* 3, no. 2 (Fall 1985): 31-40.

72 percent of the respondents suggest at least an overview knowledge. Third, the findings on data bases and operating systems reinforces the need for substantial work on this type of software. In addition, the findings on computer environment suggest that the personal computer should not be the only focus of accounting students.