COMPUTER NEEDS IN THE MODERN ACADEMIC ENVIRONMENT

by

Ralph L. Benke, Jr. and Joseph E. Hollis

The industrial revolution, which began in Great Britain around 1760, changed business as radically as Louis Pasteur's proof of the germ theory of disease changed medicine. The industrial revolution caused the transition from manual to machine techniques of production that resulted in the domestic system of production giving way to the factory system.

Over two hundred years after the beginning of the Industrial Revolution, another upheaval is being visited on business. The Information Revolution spearheaded by the development of computers, is changing the way we do business, the way we educate business students, and even the way we think about business. Business faculty that are not up to date on computers or are not keeping their students up to date, are going to find that they and their students will be at a competitive disadvantage.

Recently, Wisconsin computer owners tied into a local cable television channel thereby gaining access to 100 different information sources provided by the cable network. In Boston some 2000 personal computer users began attending technology seminars and talking with one another via their computer terminals thanks to McGraw-Hill's new nationwide Byte Information Exchange. Citibank, the nation's largest bank, set up a 24-hour global electronic trading, information, and financial service for a range of commodity spot and contract markets that will feed into the computer terminals of banks throughout the world.

These are only recent examples of the Information Revolution. Every week brings the announcement of a new information service or network. The futuristic view of an electronic society gets closer every day. Business faculty and students that lack a firm understanding of computers - what they can do and how to use them - live with the constant danger of not being able to compete effectively in today's university or business environment.

The First Computers

When the first computers were built in the early 1950's, they were so large and expensive that many people did not take them seriously. One well-known scientist at the time predicted that only the government would have the money to build and maintain these huge and delicate machines. He recommended that the government establish 11 U.S. computer centers and lease time on the computers to scientists and businesses.

The scientist underestimated the strength behind the Information Revolution. It wasn't long before many businesses had their own computers, applying them initially to financial analysis and record keeping.

But computers rapidly decreased in cost and size while growing dramatically in power and performance. Other factors, such as the development of disk storage devices that replaced punched cards, allowed greater amounts of data to be stored and manipulated on computers of all sizes. The result is that today's desktop computer can outperform the early room-sized computers in speed and capacity.

Today's Business Environment

New business graduates cannot compete effectively in business without a computer background, particularly in microcomputers (sometimes referred to as personal computers). College educators know this, but they have been slow to respond to the need. Some of them feel that computers have not proven themselves as much as the computer enthusiast insist. Many faculty are not from the microcomputer generation, and simply do not understand them. The annual problem of colleges and universities and lack of money, keeps many faculty that recognize the need from responding to it. At the same time businesses that hire today's graduates expect them to have a background in computers - something more than knowing that you do not use a Xerox machine to copy a disk and the floppy disks do not really flop.

A survey conducted in late 1984 and published in the fall 1985 edition of the Journal of Accounting Education¹, indicated that electronic spreadsheet applications are the most important for graduating accounting students to know. While the survey focused on accounting students, there is no doubt that the results are equally applicable to other business majors. For example the survey (See Table 1), showed that industry wants the graduates it hires to have a strong background in spreadsheets.

TABLE 1

	Non-Big Eight CPA Firms	Big Eight CPA Firms	Industry
In Depth Knowledge	43%	63%	38%
Working Knowledge	57%	37%	54%
Overview	0	0	8%
No Knowledge	0	0	0
	----	----	----
	100%	100%	100%

Ninety-two percent of the industry respondents to this survey want the business students they hire to have either a working knowledge or in depth knowledge of spreadsheets. Only a very small percentage, 8 percent, wanted an overview, and none of the industry respondents felt that the business students they hire need no knowledge of spreadsheets. In spite of this evidence, there are probably fewer than 200 colleges or univer-

sities in the U.S. that provide their business graduates with some knowledge of computers, let alone knowledge about spreadsheets.

How Are Spreadsheets Used?

Examples of how spreadsheets are used in industry are almost endless, but citing a few will make the point. One company, which uses spreadsheets extensively, has their entire budgeting process on Lotus 1-2-3. When the current projections for sales are entered in the proper locations on the spreadsheet, they can recalculate the entire budget with the press of a single key. All of the expenses are tied to the sales, so that with the projected sales information the expenses are automatically recomputed giving the company a new projected net income. In this manner the company can see quickly how a change in sales will affect their expenses and net income. They can also do the same thing with a change in any or all of the expenses.

Another company, which was contemplating a major acquisition, put the financial data of the acquisition in a spreadsheet. Using the spreadsheet, they could manipulate the financial information about the company to determine the margin of error in the price they were considering for the acquisition. The projected financial statements that came out of the spreadsheet were used in the negotiations.

If you know how to use spreadsheets, you can manipulate almost any type of data quickly. Spreadsheets are used by charitable organizations to keep track of contributor addresses, the amount of the contributions, and the dates of the contributions. (There are easier ways of doing this now with special programs designed specifically for charitable organizations.) Spreadsheets can be used for standard costing variance analysis, process costing, present value calculations and a host of other types of activities.

The advantage of using a spreadsheet is that once the spreadsheet has been set up, the company can concentrate on the decisions that can be made with quick manipulations of the data rather than on the calculations, which are often tedious. Managers can use their time more efficiently, and make better decisions.

What Else Do Business Graduates Need to Know

Knowledge of spreadsheets is important, but that isn't all that industrial employers want business graduates to know. Data base management, word processing, general ledgers, basic programming, graphics, file transfers, and downloading from a mainframe all appeared high on the list in the 1984 survey. (See Table 2)

Probably the biggest surprise in Table 2 is the percentage of companies that want business graduates to have an in depth knowledge of graphics (23%) or at least a working knowledge (31%). Few business graduates have this knowledge, even those that attend colleges or universities that have active programs

in microcomputers. The reason, however, why companies want this knowledge is fairly obvious. Visual comparisons are often more easily understood than numerical comparisons. Sales projections on a bar chart or expense comparisons on a pie chart convey information better and more quickly than simply looking at the numbers.

The companies desire for data base management knowledge is more understandable. Most companies have large data bases of customers, suppliers, inventories and the like. This is closely related to the companies desire for spreadsheet knowledge among business graduates. Most data base management programs either have spreadsheets built in or allow the user to transfer information for the data base to a spreadsheet, such as Lotus 1-2-3. One magazine company keeps its subscribers on a data base management program that is used to print out mailing labels. The subscribers bills are printed from the same program. analysis of accounts receivable, however, is done by transferring the data base information to the Lotus 1-2-3 spreadsheet.

Data base management is not quite as popular as it used to be. Many of the early applications, such as handling accounts receivables, accounts payables, and payroll can be done better now with special programs that are designed just for that purpose. Even so, a lot of information can be generated quickly about such groups as customers from a data base management program.

The survey shows that accounting firms don't expect the same level of expertise as industry. Accounting firms are serving industry, and they feel that accounting graduates need only enough information about data base management to understand what their clients are doing.

Only a few firms are interested in business graduates having an in depth knowledge of word processing. This is not surprising. Word processing is important, but not to graduating business majors. Word processing is important to the thousands of people who write their own reports or are required to type documents written by someone else. Indeed, word processing has revolutionized office management. However, as business graduates learn how efficient word processing is and firms purchase more microcomputers, it will become increasingly important for business graduates to have knowledge of word processing. After all, why should a businessperson write out in longhand a report for someone to type when it could be entered directly by the originator on a microcomputer with a word processing software package that checks spelling and grammar and prints the results automatically in final form?

It is a little hard to understand why industry is so interested in business graduates having a working knowledge or better in basic programming, file transfers and downloading from mainframes. Since many of today's business students minor in data processing or computer science, they are generally well prepared in a programming language, but the need for the knowledge and preparing students with the knowledge seems illogical. Students need to know how computers operate, and what they can do or can not do. However, in the past ten years the process by

Table 2

Desired Depth of Coverage
of Microcomputer Concepts

	Non-Big Eight CPA Firms	Big Eight CPA Firms	Industry
Operating Systems			
In Depth Knowledge	0%	0%	0%
Working Knowledge	73	62	46
Overview	27	38	38
No Coverage	0	0	14
Data Base Programs			
In Depth Knowledge	20	0	24
Working Knowledge	33	62	38
Overview	47	38	38
No Coverage	0	0	0
Word Processing Programs			
In Depth Knowledge	13	13	8
Working Knowledge	20	37	62
Overview	53	50	8
No Coverage	14	0	22
General Ledger Programs			
In Depth Knowledge	20	0	23
Working Knowledge	40	12	31
Overview	20	88	31
No Coverage	20	0	15
Transferring Files Between Programs			
In Depth Knowledge	13	0	8
Working Knowledge	47	43	69
Overview	33	43	23
No Coverage	7	14	0
Downloading From Mainframe			
In Depth Knowledge	0	25	15
Working Knowledge	13	12	62
Overview	73	63	23
No Coverage	14	0	0

Note: The data for this table is taken from Waller, Thomas C. and Rebecca A. Gallun, "Microcomputer Literacy Requirements in the Accounting Industry, " Journal of Accounting Education," Volume 3, Number 2 (Fall 1985).

which that knowledge is acquired by business students has changed.

As recently as five years ago, most business students learned how computers operated by learning a programming language, such as BASIC or COBOL. While a business student might never actually program in these languages, knowing a programming language gave students the required knowledge about how the computer operated. Today, knowing a computer language is not the only or even the best way to learn what a computer can do. The best way is to learn applications for the microcomputer. By knowing applications for the microcomputer the student learns what computers, both large and small can do. Because microcomputers are easier to operate, the student can experience more applications, and learn more. In addition, the place of learning is not restricted to a special lab or room. It can be done in an office or at home or even in an airplane. The microcomputer has not only changed business, it has changed our lives.

File transfer and downloading from a mainframe seems a little too technical. In business large enough to use a mainframe, technical experts can prepare simple programs for downloading or file transfer that allow the user to accomplish either with very little knowledge of the process. The time necessary to train students in either of these procedures could be better used training them in spreadsheets or other applications.

Although networking or modems didn't score high in the survey, they are both going to become increasingly important. To date, networking programs (transferring data between computers directly) haven't worked very well. Lately, however, IBM has developed a new networking program that seems to work, and we can expect to see much more networking, since it allows more efficient use of microcomputers.

Modems, the hardware used to transfer data between computers, are going to be a necessary item as the information revolution gathers steam. They allow the computer users to connect with the many new sources of information that are available, such as the information sources mentioned earlier that are available to some Wisconsin computer users. Computer science majors have already discovered that the best way around the long lines for computers is to use a modem and upload their program into the university computer from their microcomputer, then download the result to their microcomputer. They don't even have to leave their dormitory to do it.

WHAT WILL BUSINESS STUDENTS NEED TO KNOW IN THE FUTURE

What businesses expect business graduates to know today is not what they will expect them to know tomorrow. Micros and applications software are steadily becoming more sophisticated. The rate of improvement in microcomputer software, in fact, is so rapid that only the most dedicated can keep up to date. Visicalc, for example, was the latest word in electronic spreadsheets from about 1981 until 1983. Even while it was winning awards as the best microcomputer program, the next generation of

spreadsheets was coming on the market. Lotus 1-2-3, which proved the most popular among these, combined database management, spreadsheets, and graphics in a single package. Other integrated software packages, such as SuperCalc, VisiCalc IV, and SeriesOnePlus soon followed.

But even as Lotus 1-2-3 was growing in popularity, its inceptor, Lotus Corporation, was working on an even more advanced package called Symphony. Symphony, an enhanced and expanded version of Lotus 1-2-3, became available in early 1984, and combines database management, spreadsheets, word processing, graphics, and telecommunications. Because all data is stored in a common area called the worksheet in Symphony, the data can be accessed by any of the five areas.

Framework, from Ashton-Tate, is a similar package and a close competitor of Symphony which came out about the same time. The major difference between the two is that, while Symphony performs through parameters defined by numerical information, Framework is syntax-driven, oriented to manipulating words and ideas.

One result of these speedy developments is that buyers became afraid to purchase software. Improved or better software appeared almost before users had a chance to learn how to use what was then current. Once a business has developed applications for a program such as 1-2-3, it is not easy to change to another program like Symphony or Framework. Just recently, we have seen Symphony developed from Lotus 1-2-3, Framework II from Framework, dBase III from dBase II, and integrated accounting packages from individual modules, such as accounts receivable.

As buyers paused to catch their breath, software companies have been obliged to slow down. Still, the availability of a myriad of hardware products - computers, monitors, printers, memory expansion and other peripheral equipment - severely complicates the problem of knowing what is going on in the microcomputer marketplace. New products come and go faster than new brands of beer. As a result, many buyers have resorted to purchasing products made by established companies, such as IBM and AT&T. Yet even that path can be the wrong one. As an example, about 120,000 IBM PCjrs were sold during the Christmas season in 1984. In early 1985, IBM announced that it was discontinuing the PCjr.

Unfortunately, college training does not prepare graduates for the rapid changes that are taking place in the microcomputer arena. Colleges and universities lack the expertise and money to keep up to date. More than one college or university has installed a new computer lab and purchased up to date software only to discover within a year or two they are already one generation out of date.

So, what should business faculty do? There is only one answer. Buy a microcomputer and learn how to use it. Buy it now. It is better to be wrong because you did something than to be wrong because you did not do something. And, even if you buy the "wrong" computer or software programs, you will learn a lot about how computers and software programs work.

You might have access to a microcomputer and feel that you

don't need to own one, and you may be right. Nevertheless, simply having access to a microcomputer is not really sufficient. You need one that you can work on anytime you want, anyway that you want.

Software is expensive, but buy it anyway. The only way to really learn how to use database management, spreadsheets, or word processing software is to do it yourself. You might begin by attending a program designed to teach the basics of Lotus 1-2-3, Symphony, WordStar 2000 or some other program, or one that simply covers the basics of microcomputers. However, you will not really understand microcomputers until you use them.

Why bother to spend the time and money on buying and using a microcomputer? There are three compelling reasons why. First, it will improve your productivity, particularly for written material. Word processing is almost a necessity for anyone who writes frequently. Turn around time for typing is reduced to zero, and with a spelling and grammar software program, the end result is better.

Second, new business graduates need to be trained in using microcomputers, and unless you know enough about them to help your students, you will handicap those that graduate from your program. Other colleges and universities are training their graduates, thereby giving them an advantage in the marketplace.

Third, and the most compelling reason for owning a microcomputer, is that we are in the middle of an information explosion, and the faculty member that does not understand microcomputers is going to be left way behind. Hundreds of thousands of computers are sold every year, and there is no limit in sight. New applications come out every week. Subscribe to the leading computer magazine for the computer you buy, and read it faithfully. You will not use everything in it, but you will be familiar with the latest hardware and software.

Microcomputers are not going to go away. They are not a fad. If you do not learn them now, it will be harder when you turn to them tomorrow. In today's business environment, the question is not whether, but when.

Endnote

1. Waller, T. and R. Gallun, "Microcomputer Literacy Requirements in the Accounting Industry: A Pilot Study," Journal of Accounting Education, Volume 3, No. 2 (Fall, 1985).