

# Developments in Business Simulation & Experiential Exercises, Volume 13, 1986

## USING OF MULTIPLE, MICROCOMPUTER APPLICATION PROGRAMS TO TEACH FUNDAMENTAL BUSINESS CONCEPTS AND PRACTICES

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### ABSTRACT

A group of relatively simple application programs were used to help teach basic business management concepts and practices via the microcomputer. The seven topics covered were: Basic Financial Record-keeping Practices; Cost Allocation Techniques; Economic Order Quantity; Cost-volume-profit Analysis; Compound Interest Concepts; Financial Statement Ratio Analysis; and Queuing Concepts. This paper describes the programs that were used, explains how they were incorporated into the course, identifies some of the specific educational benefits of each, and summarizes the advantages of using multiple, stand-alone application programs in the classroom.

### INTRODUCTION

Several microcomputer application programs were used to teach fundamental business management concepts and practices. The primary purpose of this paper is to describe these programs, to explain how they were used in the course, and to identify some of the perceived benefits.

### COURSE DESCRIPTION

The course involved in this experiment was entitled "Microcomputer Business Management Skills." It was offered through the Continuing Education Division of a four-year university. The primary objective of the course was to help participants improve their business management skills with the aid of a microcomputer. Students attended class four hours per day for five consecutive days and received one semester hour of undergraduate credit. Daily lab sessions were available but not required.

The class consisted of twelve students whose ages and occupational backgrounds varied widely. Nine students held bachelors or masters degrees. However, only four students had business degrees and/or business experience. Six students had no prior experience with microcomputers, three had a few hours of experience, and three had several hours of experience with microcomputers prior to this class.

On the first day of class, about thirty minutes was devoted to start-up and operating procedures of the microcomputer. This session also included brief explanation of the operating system and a demonstration of disk handling etiquette.

The following business concepts and practices were covered:  
Basic Financial Record-keeping Practices;  
Cost Allocation Techniques;  
Economic Order Quantity;  
Cost-volume-profit Analysis;  
Compound Interest Concepts;  
Financial Statement Ratio Analysis;  
Queuing Concepts.

Each topic was introduced with a brief lecture followed by a question and answer period. Students were then given input

data and told to load and run the appropriate application program or programs. All students were encouraged to seek assistance when needed and to ask questions as they proceeded with the assignment. This resulted in extensive individualized instruction and discussion.

When most students had completed an assignment, the class was called to order to discuss the results. A special effort was made to relate relevant concepts or practices to computer-generated output. In some cases, output was in the form of printed hardcopy. In other cases, students were directed to transcribe output from the monitor to spaces provided on the input document. Students who had not entirely completed the assignment were asked to do so during lab sessions or whenever time permitted.

All application programs used in this course were selected from a single diskette containing one hundred menu-driven business programs. They were purchased as a unit for \$149.95. The vendor offers TRS-80, Pet, Apple, Atari, IBM, Osborne and CP/M versions, some of which can be purchased for about one hundred dollars.

The programs used in this course are grouped by topic and discussed in some detail in the following paragraphs. Program and documentation quality varied widely. Consequently, students had an excellent opportunity to observe the differences.

### TOPICS AND RELATED PROGRAMS

#### Basic Financial Record-keeping

Financial records which provide accurate, complete and relevant information are a prerequisite to sound business decision-making. Following a brief lecture on some of the basic record-keeping needs of a business, five programs were used to demonstrate how these records can be maintained on the microcomputer.

CHECKBK1 is a self-documenting, checkbook maintenance program designed to keep track of all payments and deposits. Users are prompted to input date, payment or deposit code, payee, amount and item classification. Checks and deposits can be classified into a maximum of one hundred categories. Checkbook items can be stored on diskette and additional items can be added as needed. Editing of checkbook items is also possible.

This program is particularly valuable to students who have had little, if any, experience with microcomputers. Since nearly everyone has maintained a personal checking account, they can concentrate on the activities performed by the computer rather than the mechanics of maintaining a checkbook. They quickly learn how to interact with menu-driven programs and how to save and retrieve data files. Equally important, they learn how convenient it is to correct errors and to list data on the monitor or on paper. Finally, the ability of this

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program to list checkbook items by category clearly demonstrates how computers can be used to extract valuable management information quickly and easily.

CHECK2 is simple check-writing program which permits the user to print checks on preprinted, continuous-feed check form. The forms must be loaded on the printer before the program is run. A check register is also generated for each run. Since these two tasks are accomplished by the computer from a single set of data input, students see firsthand the labor-saving aspect of computers.

PAYROLL2 is program which computes weekly federal and FICA withholding as well as net pay for each employee. Each payroll record includes current, month-to-date, and year-to-date totals to facilitate the preparation of 941 or W-2 forms. Payroll is another topic to which students readily relate. This permits emphasis on computer activities. A report-generator option on the main menu permits the printing of a payroll register or a complete employee list with three levels of totals. The ability of the computer to create, Manipulate, and store large quantities of data is clearly demonstrated by this program.

INVOICE is program which generates a simple but very important business document - the sales invoice. Everyone is familiar with its content and purpose. The user of this program enters customer information and details of each item sold, including quantity and unit price. The program calculates extended amounts for each item, total sales tax, and total invoice price. Pre-printed forms are required in actual practice but are not necessary for classroom purposes. A summary report of all invoices, including appropriate grand totals, is generated after each invoicing run. These totals can be used to prepare required accounting entries and to compare to batch control totals. This program helps students understand the need for the speedy and accurate preparation of invoices and similar business documents.

INVENT2 is a relatively complete inventory control program. Each inventory record includes information about the quantity on hand, last unit cost, average cost, selling price, reorder point, maximum quantity permitted, quantity ordered this period and for each of the preceding two periods, as well as item description, item number and vendor number.

The program can generate a list of inventory items which includes all of the information identified above. It will also list inventory items provided by each vendor and any inventory items below the reorder point. Finally, it can generate an activity report, showing for each inventory item, the quantity on hand, the quantity ordered this period and the quantity ordered last period. The primary educational benefit of this program is to demonstrate that microcomputers can provide valuable management controls as well as routine file information.

ACCTREC is a balance-forward accounts receivable system. Somewhat more complicated than the application programs described above, this program creates an invoice file and a customer account file from user-entered invoice data. The invoice file is maintained until the program is directed to post invoices to customer accounts. Each customer account contains information about charges for the current month, an aging of all past due amounts, the amount paid last month, the amount charged last month, and the total amount owed. All information is stored on diskette and can be edited at any time. On command, the system will generate a list of all invoices, a complete customer list, a complete customer list with invoices attached, and an aged receivables report. This program builds and expands on all of the computer-oriented

record-keeping techniques learned from previous application programs. In particular, it demonstrates how multi-purpose application programs bring about an integration of data files and business systems.

In summary, the preceding programs were intended to demonstrate that accurate and complete financial records are vital to sound business decision-making and that the microcomputer is a very useful tool in the record-keeping activities of small businesses. Students gained an understanding of the power of electronic record-keeping by hands-on experience.

### Cost Allocation Techniques

There are many application programs which involve cost allocation techniques, however, none are quite as uncomplicated as those which calculate depreciation. Four simple depreciation programs were used in this course to demonstrate how the cost of depreciable assets might be allocated for accounting purposes.

DEPRSL is program which, given the asset cost, salvage value and estimated useful life, prepares a cost allocation schedule showing the depreciation for the current period, the accumulated depreciation, and the book value for the life of the asset. Students were given one example on the chalkboard. They were then given a sheet of input data which systematically altered salvage value and estimated useful life. Upon review of the output, students quickly saw how these values could affect depreciation expense and net income. Students also grasped the straight-line or "constant charge" cost allocation method after a few runs.

DEPRSY is a program which prepares a cost allocation schedule using the sum-of-the-year's-digits (SYD) method of depreciation. SYD is a "decreasing charge" method whereby more depreciation is taken in the early years of an asset's useful life. Once again, students were given an example on the chalkboard. Then they were asked to run the program using input data that had been provided and to observe the results.

DEPRDDB is another cost allocation program which prepares a depreciation schedule using the double declining balance method. In a chalkboard example, students were shown how to compute the straight-line rate, to double that rate, and to apply it on the declining book balance of the asset. After a few runs, students quickly discern the difference between this decreasing charge method and the SYD decreasing charge method discussed above. They readily understand why both of these methods are sometimes referred to as "accelerated" depreciation methods.

The major educational benefit of the depreciation programs was that students could concentrate on the results rather than on the mechanics of computation. Students could see that depreciation methods are merely cost allocation techniques. Consequently, they were not surprised to learn that, for accounting purposes, any systematic and rational method of depreciation is acceptable.

### Economic Order Quantity

EOQ, FQEOQ, FQEOQP, and FQEOWSH are programs designed to calculate, for each inventory item, the quantity which should be ordered each time an order is placed. Students were introduced to three categories of inventory costs in addition to the direct cost of product: reorder costs, holding costs, and stockout costs. After a brief discussion and simple chalkboard

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example, students understood that the optimum order quantity minimizes the total of these three costs. They were then required to run each program, inputting for each inventory item, estimated annual demand, inventory costs, and other relevant data.

Students were made aware of the fact that data input requirements differ among the four programs because each program incorporates a different set of assumptions to calculate order quantity. EOQ assumes no stockout costs and no lead-time on orders - i.e. immediate delivery. Students generated the optimum order quantity for several items by entering annual estimated demand, annual holding costs and the cost of placing an order. FQEOQ also assumes no stockout costs but it does require the user to enter an order lead-time in addition to the inputs required by EOQ. In return, FQEOQ calculates a reorder point in addition to the economic order quantity. Students could observe the impact of order lead-time by comparing the results of these two programs.

Other complexities are introduced in the remaining two programs. FQEOWSH assumes a stockout cost and FQEOQPB assumes that purchase price breaks will be received for ordering in larger lot sizes. Each program requires additional input data.

With the aid of these programs, students were able to execute several trials within a matter of minutes. Consequently, they had an opportunity to compare and to analyze results while the concept of economic order quantity was fresh on their minds. Had they been required to prepare manual calculations, only a few trials would have been permitted and much less emphasis on the concept would have resulted.

### Cost-Volume-Profit Analysis

Analyzing the effect which changes in costs and sales levels will have on the income of a business is confusing to many students. Too often they try to memorize formulas or follow examples only to get bogged down in detail and to lose sight of the concepts involved. Two programs, BREAKEVN and CVP, help students avoid this problem.

BREAKEVN calculates the number of units a business must sell in order to break even. The user must enter total fixed costs, variable cost per unit, and selling price per unit. Once the break even point has been calculated, the program will also determine the number of units which must be sold to earn any desired amount of profit before taxes. On the other hand, CVP, calculates the amount of sales required to generate a desired amount of net income after taxes. It will also calculate net income after taxes for a specified amount of sales. The tax rate must be included as part of the input.

More than any other programs discussed to this point, these two programs helped students to understand the "what if" approach to cost analysis. Multiple trials with appropriate variations made this abundantly clear.

### Compound Interest Concepts

Compound interest is a very simple concept yet most students find it very difficult to apply, especially in situations involving present values. Several programs were used in an effort to reduce this problem. The introductory lecture included a brief explanation of present value concepts and several simple chalkboard examples of practical compound interest problems. Students were then

given input data and asked to run seven programs.

FVAL computes the future value of a lump-sum each time an annual interest rate, the number of periods, and a present value is entered. PVAL computes the present value of a lump-sum each time an annual interest rate, the number of periods, and a future value is entered.

LOANPAY introduces the annuity concept by computing the monthly payment required to pay off a specified loan amount at a specified rate of interest in a specified number of payments. MORTGAGE is similar to LOANPAY except that it generates an amortization table showing the monthly payment, the amount allocated to interest, the amount allocated to principal, and the principal balance. This table seems to have a very reassuring effect on students. Perhaps it is something to which they can more readily relate.

A more sophisticated program, ANNUL computes any one of four desired values from appropriate input. Given a monthly payment amount, number of payments, and annual interest rate, it will compute the future value or the present value of the annuity. Alternatively, it will compute the monthly payment or the annual interest rate required in the circumstances indicated by proper data input.

Finally, students are required to evaluate uneven cash flows using the NPV and RRVARIN programs. Given specified cash inflows and outflows, NPV computes the net present value of these sums for any specified interest rate. Given the same cash flows, RRVARIN computes the actual rate of return. These two programs introduce students to two of the more common approaches to capital budgeting.

In summary, the seven programs described above were intended to help students understand and to apply compound interest concepts. They certainly seemed to enjoy the effort.

### Financial Statement Ratio Analysis

A single program, FINRAT, was used to compute some of the more commonly used financial ratios. Students entered balance sheet and income statement data as provided. The program generated thirteen common ratios. We then discussed how the ratios were computed and how they could be used to analyze a business.

### Queuing Concepts

Students were given some examples of queuing problems and some definitions of terms related to queuing concepts. They were then asked to run QUEUE1. For each mean arrival rate and mean service rate entered, this program calculates the average length of the queue, the average length of the system, average waiting time in the queue, and average waiting time in the system. This exercise was intended to give students a glimpse of a more sophisticated management tool.

## SUMMARY AND CONCLUSIONS

Using multiple application programs to teach fundamental business concepts and practices offers several educational benefits. First, the use of multiple programs allows the instructor to cover a broad range of topics. A single piece of software cannot be expected to meet all of the objectives of an introductory business course.

Second, most of these programs are easy to use because they only perform a simple task or two. Inexperienced users can load and run such programs with very little assistance.

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Third, students soon gain self-confidence as they load and run several short programs. This is particularly important to those students who have had little or no experience with a microcomputer.

Fourth, simple programs require a minimum of storage space. Since several programs can be stored on the same disk, fewer disks and less disk handling is necessary. This is especially important in large introductory classes.

Fifth, simple programs are less expensive yet often accomplish educational objectives better than more complex programs. Educators can seldom afford to spend more than necessary to get the job done.

Sixth, less complicated programs are easier to modify to meet special classroom needs. Even a novice programmer can make minor adjustments to simple BASIC programs.

Seventh, students have an opportunity to compare and evaluate several programs during a short period of time. They quickly learn that some programs are easier to use and meet user needs much better than others. As part of each assignment, students were asked to evaluate all of the programs used in this course.

Students were also asked to evaluate the course twice while it was in session. The results strongly support the benefits cited above and the multiple-program approach to teaching basic business concepts. For example, when students were asked to identify the best part of the course, one-half of the class explicitly stated that it was the opportunity to use many different software packages. When asked if the course could be changed to better meet their needs, eleven of twelve students gave a negative answer. In addition, a large majority of students also indicated that the pace of the course was just right, the lecture presentations were just right, and that they were learning what they wanted from the course.

In summary, the microcomputer can be a useful tool in the classroom. However, course content is difficult enough without the additional burden of learning how to use complicated software packages. The relatively simple programs used in this experiment seemed to enhance rather than distract from the learning process.