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## COMPUTER-ASSISTED INSTRUCTION FOR FINANCIAL MANAGEMENT

Emerson M. Babb

### Abstract

This paper describes computer-assisted instruction for financial management which can be used to supplement an undergraduate course or to update training of persons in agribusiness. It is used to review principles of financial management, to illustrate analytical techniques, and to provide practice in the use of financial concepts and techniques. The material covered is similar to that found in traditional textbooks. Student evaluations of the software were fairly positive, but teaching effectiveness needs to be measured.

*Key words:* computer-assisted instruction, financial management, micro-computer.

This article describes microcomputer software which was designed to supplement an undergraduate course in financial management and to update the financial management training of middle-level managers of agribusiness firms (Babb, Leburg, and Fife). The software includes computer-assisted instruction (CAI) for financial management (TUTOR), and its objectives are: (1) to review principles of financial management; (2) to illustrate analytical techniques used in financial analysis; and (3) to provide practice in the use of financial concepts and techniques.

### REVIEW OF LITERATURE

The term computer-assisted instruction has been used to denote a wide range of computer applications for teaching purposes, such as simulators, management games, programmed learning, and computer managed instruction. Today, CAI is generally used to define a more

limited set of software that teaches a specific topic and may contain exercises which reinforce what is taught. This is more akin to lecture notes, class materials, and transparencies used to supplement a text. In a sense, the computer substitutes for the teacher. As pointed out later, CAI may be more effective if it supplements rather than substitutes for the teacher.

Computer-assisted instruction has been used at several universities to teach economics (Soper). It was processed on main-frame computers and was usually tied directly to a course. The content of CAI was fixed and, in some respects, not greatly different than one would expect in a textbook. Some studies' evaluations were neutral to negative (Siegfried and Fels). It was found to be more costly than conventional teaching methods and did not provide release time for students or teachers. In most previous experiments, there were not significant differences in performance or differences in attitudes about economics between students who used CAI and those who did not (Davisson and Bonello). These results probably account for the decline in interest in developing and using CAI during the past ten years.

Computer trade magazines are now predicting that there will be a dramatic expansion of CAI software, and there are high expectations about its potential uses. This may reflect the passage of time since the less than enthusiastic reviews of CAI ten years ago. But the widespread availability of microcomputers makes the use of CAI more feasible to a much broader spectrum of teachers and students. In addition to computer laboratories and special teaching facilities at universities, the home.

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office, and workplace can now become classrooms for CAI. Perhaps most importantly, CAI being produced currently tends to be designed as a supplement to more conventional teaching methods rather than a substitute (Dahlgran).

## DESCRIPTION OF THE SOFTWARE

Training directors from several large cooperative organizations served as advisors for the development of TUTOR. They were particularly helpful in identifying the potential audience and in testing the software. Beyond this, textbooks used in undergraduate financial management courses were used in development of the software. TUTOR operates from menus and prompts so that the student need only to be familiar with the disk operating system for the computer being used. The main menu looks much like the table of contents of a traditional financial management textbook (Table 1). While the chapters are arranged in a logical sequence, they can be accessed in any order.

TABLE 1. FINANCIAL MANAGEMENT TOPICS  
CONTAINED IN TUTOR, MAIN MENU

Chapter	Title
1	Introduction
2	Decision Making
3	Financial Statements
4	Measurement of Financial Analysis
5	Breakeven Analysis
6	Investment Analysis
7	Cash Management
8	Credit Management
9	Inventory Management
10	Risk Management
11	Projecting Financial Results Glossary

Exercises in each chapter provide practice in the application of concepts and techniques such as breakeven analysis, cash budgets, sources and uses of funds, profitability model, and present value of investment. The exercises in TUTOR probably make the most important contribution to learning. They are based on an operating statement and balance sheet generated by a simple model of a farm supply business handling feeds, fertilizers, and grains (Tables 2 and 3). The model is stochastic so that results to be used in the exercises change each time TUTOR is used. In addition, students are asked to make several decisions which demonstrate the impacts of credit policies, inventory management, and the like. If students enter incorrect responses in exercises, they have options to go to earlier parts of the chapter for review, to go to a glossary which contains formulas and definitions, to skip to the next exercise, or to obtain

TABLE 2. SAMPLE OPERATING STATEMENT FOR  
FINANCIAL MANAGEMENT TUTOR

	Dollars	Percent	Volume
Sales			
Grain	1,764,081.	51.6	509,836.
Feed	725,056.	21.2	3,398.
Fertilizer	982,126.	27.2	4,175.
Total	3,421,213.	100.0	
Cost of Good Sold			
Grain	1,601,016.		
Feed	619,683.		
Fertilizer	774,597.		
Total	2,995,246.	87.5	
Gross Margin			
Grain	163,015.	9.2	
Feed	105,423.	14.5	
Fertilizer	157,529.	16.9	
Total	425,967.	12.5	
Service Income	187,546.	5.5	
Gross Income	613,513.	17.9	
	Dollars	Percent	
Operating Expenses			
Depreciation	37,500.	1.1	
Fixed Facilities	134,252.	3.9	
Variable Facilities	76,795.	2.2	
Fixed Service	6,400.	0.2	
Variable Service	15,221.	0.4	
Fixed Labor	106,000.	3.1	
Variable Labor	30,410.	0.9	
Advertising	10,000.	0.3	
Bad Debt Loss	4,275.	0.1	
Interest	49,500.	1.4	
Total	470,353.	13.7	
Net Operating Income	143,160.	4.2	
Other Income	8,900.	0.3	
Net Income (Before Tax)	152,060.	4.4	
Income Tax	54,259.	1.6	
Net Income (After Tax)	97,801.	2.9	

TABLE 3. SAMPLE BALANCE SHEET FOR  
FINANCIAL MANAGEMENT TUTOR

Assets	
Current	
Cash	79,017.
Treasury Notes	10,000.
Accounts Receivable	128,259.
Inventory	99,979.
Total Current	317,255.
Non-Current	
Stock in Coop.	10,000.
Plant and Equipment	977,683.
Land	30,000.
Total Non-Current	1,017,683.
Total Assets	1,334,893.
Liabilities and Equity	
Current	
Accounts Payable	148,317.
Principal Payable	50,000.
Friendly Finance	0.
Total Current	198,317.
Non-Current	
Bank Note	400,000.
Total Liabilities	598,317.
Patronage Stock	300,000.
Retained Earnings	436,576.
Total Equity	736,576.
Total Liabilities and Equity	1,334,893.

a display of the correct answer and solution procedure. Students are encouraged to work through TUTOR at their own pace and to repeat exercises until they feel confident that they understand and can use financial concepts and tools of analysis.

## EVALUATION

Undergraduate students and middle-level managers of farm supply cooperatives were the target audiences. Middle-level managers often have B.S. degrees in agricultural economics or business, some in-house training, and three to five years' experience in various segments of the business. They would be approaching a time for assuming greater management responsibilities which would require the use of concepts and tools of financial management they had learned in undergraduate courses. Unfortunately, much of this material would have been forgotten because there had not been occasion to use it. TUTOR was thus viewed as an inexpensive way to provide a review of material previously learned—a refresher course. With use in the field, it greatly reduces direct and opportunity costs involved with bringing people to a central location for training. In a similar vein, TUTOR was viewed as a supplement for an undergraduate class in financial management.

There is a void of research on the effectiveness of CAI used in a business environment. Evaluation of TUTOR in a business environment is quite limited and is based on the experience of subjects during the pretests. They had diverse levels of experience with computers and knowledge of financial management. Managers in the pretests reported high levels of interest and involvement. Only minor problems in using TUTOR were reported, and even inexperienced users were able to solve these problems. They liked the organization of TUTOR which permitted them to work through the 11 chapters in any order and at their own pace.

Undergraduates in a farm management course taught at the University of Florida used TUTOR for half a semester in the part of the course dealing with financial management. Most students had no prior experience with microcomputers. Students relied on the instructions about operation of the software contained on the diskette rather than the instruction manual which was provided. Lectures in the course covered the material in TUTOR and reading assignments were made for chapters in TUTOR and in the text. Incen-

tives to use TUTOR were no different than those to study the text.

Students evaluated TUTOR at the end of the semester. Their overall rating on a scale where 1 equals poor and 10 equals excellent was 7.4. They spent an average of 8.8 hours using TUTOR and worked through about half of the exercises. About 30 percent of the exercises were done more than once.

Students did not experience much difficulty in using TUTOR (Statements 1 and 4, Table 4). They felt they learned more from TUTOR than from the textbook (Statement 2), and that it was as valuable as lectures (Statement 3). In previous research, it was found that performance by students using CAI was inferior to those taught in the classroom (Wentworth and Darrell). This suggested that CAI was not a substitute for conventional teaching. TUTOR did not seem to stimulate student interest in financial management (Statement 6), and they thought it had little impact on their performance (Statement 7). In fact, the correlation between the time students devoted to TUTOR and their test scores on the subject matter was not high (simple correlation coefficient = + 0.41).

TABLE 4. STUDENT OPINIONS OF TUTOR

Statement	Number of Students					AVE. <sup>a</sup>
	SA	A	U	D	SD	
1. TUTOR is easy to use.	11	14	3	3	2	2.1
2. I learned more from TUTOR than from the textbook.	9	13	8	3	0	2.2
3. I learned more from TUTOR than from classroom lectures.	4	10	10	8	1	2.8
4. It takes too much time to learn to use TUTOR.	5	2	5	13	8	3.5
5. If I had spent the time I used on TUTOR studying the text or other materials, I would have learned more.	4	4	11	11	3	3.2
6. TUTOR stimulated my interest in financial management.	2	8	17	3	3	2.9
7. My grade in this course will be higher because of TUTOR.	1	12	12	5	3	2.9
8. A TUTOR should be developed for other courses at University of Florida.	6	11	12	2	2	2.5

<sup>a</sup>Average agreement where numerical scale used was:

- 1 = SA = Strongly Agree
- 2 = A = Agree
- 3 = U = Undecided/Neutral
- 4 = D = Disagree
- 5 = SD = Strongly Disagree

Student opinions about the TUTOR were fairly positive, and it was thus surprising that greater time was not devoted to it. Students did report some problems in finding a micro-computer available. The amount of time they spent on the text is unknown. The evaluations of TUTOR are not definitive. Research on teaching effectiveness is much needed, especially in the business environment.

### SYSTEM REQUIREMENTS

The software package for TUTOR consists of an instruction manual and a diskette with the compiled program. The program is written in Turbo Pascal. The TUTOR will run on any IBM personal computer (or compatible)

with at least 320K of memory. A color/graphics monitor adapter and a color/graphics monitor to obtain graphs which are in the chapters are required. Otherwise, a message is printed on the screen that the graph would be shown if the adapter were available. A printer is required to make a printed copy of some screens.

The diskette and instruction manual may be copied for educational use. The original diskette and manual cost \$25 and should be ordered from: Publication Distribution, Department of Agricultural Economics, Purdue University, West Lafayette, Indiana 47907. Checks or purchase orders should be made to Purdue University.

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