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The APPCO Automated Accounting System
and its Use in an Integrated MBA Program

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by

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THE APPCO AUTOMATED ACCOUNTING SYSTEM
AND ITS USE IN AN INTEGRATED MBA PROGRAM

Abstract

This paper describes the design and use of a computer-based accounting system within an integrated MBA program. An automated accounting system has been developed as the major financial information system for a large-scale corporation simulation called APPCO. The corporate simulation is large-scale in the sense that most of the essential functions of a medium-size manufacturing concern are modeled including a board of directors, a management team, a communication (MEMO) system, a manufacturing technology and a network of distributors.

In order to introduce the students to the accounting system as one component of the organization, a series of exercises are prepared including:

1. Examination of APPCO's Financial History including financial statement analysis.
2. Use of the Automated Accounting System to input transactional data, to examine account changes and to prepare monthly statements.
3. Preparation of proposals and implementation of system changes with respect to management information needs not satisfied by the current system.

4. Presentation and justification of project work to APPCO's "Board of Directors".

The actual accounting system, which is programmed in the APL computer language, is general and may have potential educational uses in other institutions.

Introduction

As an alternative to the individual courses traditionally offered, the "MBA Integrated Core" is a coordinated program of study offered to first-year graduate students at the USC Graduate School of Business Administration. The program provides team instruction in several of the basic disciplines including behavioral science, economics, marketing, finance, communication, data processing, and managerial and financial accounting. Equal emphasis is placed on student teamwork in group projects as on individual learning.

Several integrating devices are utilized to develop a bond between the disciplines so that the students gain an awareness of the many factors involved in business problem solving. A specific example of one such integrating project is the APPCO simulation of a corporate firm in which the Automated Accounting System plays an important role.

APPCO, an acronym for the Acme Precision Planter Company and originally created for a study in personnel management,¹ has been expanded at USC to include problems in economics, marketing, production control, behavior, and accounting and information systems. The students work in "consulting teams" as they attempt to identify and solve APPCO's problems through the use of memos, interviews, and presentations to the "Board of Directors."

¹Lipstreu, O., Managing Personnel Systems, Mimeograph, University of Colorado, 1970.

To provide the students with background financial data on the firm at the onset of the project, they are introduced to APPCO's Automated Accounting System -- a preprogrammed system in the APL language -- which, they are told, is not very well understood by any members of the firm. By becoming acquainted with the system by themselves, the students gain familiarity with data processing techniques, in particular the APL language, as well as with classical double entry accounting and the matrix model of accounting summarization as described by Mock and Vasarhelyi.²

Accounting System Assignments

The familiarization and use of the APPCO Automated Accounting System were handled through four phases of assignments. The first phase which coincided with class instruction in financial statement analysis and a matrix form of accounting consisted of orientation with the use of the system for retrieval of APPCO's historic financial data. This assignment provided learning experience in double entry accounting by providing immediate feedback to the student on the effects of various journal entries on the balance sheet and income statements. (See the Appendix for samples of data that may be retrieved.) Further familiarization with the system was encouraged through class instruction in APL programming.

²Mock, T. J. and Vasarhelyi, M. A., "Interactive Budgeting Models in Accounting Education," Proceedings of the Winter Simulation Conference, (January, 1973).

The second phase of the accounting system project was instigated by a request from the "Board of Directors" for financial statements prepared from three months of transactional data. In completing this assignment, the students became better acquainted with the translation of transaction data into journal entries, with the full capabilities of the system and began to examine some of the structural designs of the program software.

By another request from the "Board of Directors," phase three of the project was a request of a proposal for further augmentations to the accounting system. The final phase resulted in implementation of those augmentations that were approved and in presentation to the Board of completed projects.

NOTE: The final portions of the paper will describe in greater detail the APPCO Accounting System (see Exhibit I and the Appendix) and an evaluation of the system as a pedagogical devise. A summary of completed student projects will also be provided (see Exhibit II).

EXHIBIT I
AAS
APPCO Accounting System

Interactive Control Modules*

1. LEDGER
Capabilities for adding and deleting accounts, including financial statement accounts. Examining T-accounts. Index of all accounts on record.
2. JOURNAL
Printout of entire journal for current month or entries as of any date within month. Save previous month journals. Allows journal entries affecting any account in current month or in "Pro Forma" month. Error messages for improper entry format. (Possibly a capability for subsidiary journals, i.e., SALES, CASH DISBURSEMENTS.)
3. END OF PERIOD
First, makes request from operator for ending inventory (raw, process finished) to compute cost of goods sold. Computes income taxes due (at 50%). Closes journal, ready for next month entries.
4. END OF YEAR
Closes journal for the year. Provides end of year balances for all accounts.
5. FUNDS FLOW, CASH FLOW
Available on current month, previous month(s), or yearly data. Also on pro forma (monthly) data.
6. INCOME STATEMENT, BALANCE SHEET
Available for current, monthly, or yearly data. Up to nine months or years may be included on one table. Pro forma statements also available.
7. FINANCIAL RATIOS -- Table and graph form
Allows operator to specify any conventional financial ratios for data of any month(s) or year(s). Output available in graph or table form. Pro forma capability included.
8. (PAYROLL)
Maintains records on salaried or hourly employees; prints checks, stubs; computes tax withheld, FICA, etc.

* All modules are equipped with HELP commands to aid the operator in entry formatting, available commands and error diagnostics.

EXHIBIT II
Summary of Augmentations of
the Various Groups to AAS

Group

1 2 3 4 5 6 7 8 9

	X			X				X	X	X	X	MONTHLY JOURNALS
	X	X	X	X	X	X	X	X	X	X	X	INCOME STATEMENTS
	X	X	X	X	X	X	X	X	X	X	X	BALANCE SHEET
	X		X					X	X			CASH FLOW
	X							X				FUNDS FLOW
	X	X	X	X	X	X		X	X	X	X	RATIO ANALYSIS
			X					X				PRO FORMA
		X										MATRIX METHOD
		X										QUARTER STMTS
		X										PLOTS
				X				X				PAYROLL
				X								NEW ACCTS
								X				YEARLY F/S
												T-ACCTS
												SALES & PURCHASE JOURNALS
	X											BREAK-EVEN
		Estimating Matrix Method										

Monthly Journals
Income Statements
Balance Sheet
Cash Flow
Funds Flow
Ratio Analysis
Pro Forma
Matrix Method
Quarterly Stmts
Plots
Payroll
New Accts
Yearly F/S
T-Accts
Sales & Purchase Journals
Break-Even
Estimating Matrix Method

Other

Group

19 18 17 16 15 14 12 11 10

MONTHLY JOURNALS

INCOME STATEMENT

BALANCE SHEET

CASH FLOW

FUNDS FLOW

RATIO ANAL

PRO FORMA

MATRIX METHOD

QUARTERL STMTS

PLOTS

PAYROLL

NEW ACCTS

YEARLY F/S

T-ACCTS

SALES & PURCHASE JOURNAL

BREAK EVEN

debt
debt
debt

debt
debt
debt

Expansion
Document F/S

debt
debt
debt

debt

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

APPENDIX

SAMPLE OUTPUT

OF THE

APPCO AUTOMATED ACCOUNTING SYSTEM

LIST JOURNAL

A P P C O MONTHLY JOURNAL
PERIOD 1 1974

1	DEPRECIATION--PLANT ACCUM DEPRECIATION FACTORY DEPRECIATION FOR JAN.	26 24	14018.00	14018.00
2	DEPRECIATION--OFFICE ACCUM DEPRECIATION OFFICE DEPRECIATION FOR JAN.	25 24	6282.00	6282.00
3	CASH ACCOUNTS RECEIVABLE A/R COLLECTIONS FOR JAN.	1 2	2629000.00	2629000.00
4	PROPERTY AND EQUIP CASH PURCHASE OF EQUIPMENT.	23 1	55300.00	55300.00
5	DEPRECIATION--PLANT ACCUM DEPRECIATION DEPRECIATION ON NEW EQUIPMENT.	26 24	576.04	576.04
6	OTHER CURRENT ASSETS COST OF GOODS SOLD SELLING: GEN AND ADM CASH PREPAID EXPENSES FOR JAN.	27 13 14 1	950.00 1750.00 9300.00	12000.00
7	INTEREST EXPENSE OTHER CURRENT ASSETS CASH INTEREST ON LTD AND W/P INCLUDING PREPAID PORTION.	16 27 1	1708.33 241.67	1950.00
8	ACCOUNTS PAYABLE CASH PAYMENT OF ACCOUNTS PAYABLE FOR JAN.	7 1	1949000.00	1949000.00
9	ACCRUED TAXES CASH PAYMENT ON TAXES ACCRUED UNTIL JAN.	8 1	445125.00	445125.00
10	SELLING: GEN AND ADM BAD DEBT ALLOWANCE CHANGE TO ALLOWANCE METHOD FOR BAD DEBT ACCOUNTING	14 29	34250.00	34250.00
11	SELLING: GEN AND ADM CASH ACCRUED EXPENSES SALES COMMISSIONS FOR JAN.	14 1 30	256000.00	173950.00 82050.00
12	SELLING: GEN AND ADM CASH SUPERVISORS PAY	14 1	9681.00	9681.00
13	DIRECT LABOR CASH WAGES, SALARIES OF DIRECT LABOR.	22 1	171439.00	171439.00
14	ACCOUNTS RECEIVABLE SALES RET. DISCOUNTS GROSS SALES SALES ON ACCOUNT FOR JAN.	2 28 12	2570490.00 94250.00	2664740.00
15	NET PURCHASES TRANSPORTATION IN ACCOUNTS PAYABLE PURCHASES FOR JAN. TRANS-IT EXPENSED AS CGS.	19 20 7	1891760.00 17240.00	1909000.00
16	PROV FOR INCOME TAX ACCRUED TAXES TAXES ACCRUED FOR JAN.	15 8	115000.00	115000.00

A P P C O T ACCOUNT NO. 1
 CASH 2/16/1974

3	PREV BALANCE		
		353555.00	
		2459583.00	
			4
			6
			8
			9
			10
			11
	→ 283994.00	2813138.00	

60000.00
 11200.00
 2055610.00
 182648.00
 39675.00
 180011.00
 2529144.00

ENTER LEDGER COMMAND
 T ACCT 2

A P P C O T ACCOUNT NO. 2
 ACCOUNTS RECEIVABLE 2/16/1974

12	PREV BALANCE		
		5501490.00	
		2449015.00	3
	→ 5490922.00	7950505.00	

2459583.00
 2459583.00

ENTER LEDGER COMMAND
 T ACCT 14

A P P C O T ACCOUNT NO. 14
 SELLING: GEN AND ADM 2/16/1974

6			
9		9300.00	
10		100598.00	
14		39675.00	
16		71290.00	
		3750.00	
	→ 224613.00	224613.00	

0.00

ENTER LEDGER COMMAND

***** LEDGER ACCESS TERMINATED
 ***** END OF WORK *****

A P P C O YEARLY INCOME STATEMENT

1974

1973

GROSS SALES	33808300.00	7848517.00
LESS: SALES RET, DISCOUNTS	0.00	515012.00
NET SALES	33808300.00	7333505.00
LESS: COST OF GOODS SOLD	25860000.00	5873017.12
SELLING: GEN AND ADM	4120200.00	744425.00
PROV FOR INCOME TAX	1914100.00	320000.00
INTEREST EXPENSE	20500.00	5608.33
FOREIGN EXCHANGE	28600.00	0.00
DEPRECIATION--OFFICE	0.00	18846.00
TOTAL	31943400.00	6961896.45
NET INCOME	1864900.00	371608.55
RETAINED EARNINGS	5943300.00	7808200.00
LESS: CASH DIVIDENDS	0.00	0.00
EARNED SURPLUS	7808200.00	8179808.55

ENTER COMMAND OR END WITH CARRIAGE RETURN

***** END OF WORK *****

A P P C O PERIODIC BALANCE SHEET
1974

	1	2	3
ASSETS:			
CASH	353555.00	283994.00	409747.00
ACCOUNTS RECEIVABLE	5501490.00	5490922.00	5376647.00
LESS: BAD DEBT ALLOWANCE	34250.00	38000.00	37620.00
NET ACCOUNTS REC V	5467240.00	5452922.00	5339027.00
INVENTORY	1549442.00	1969100.00	2033521.00
OTHER CURRENT ASSETS	1191.67	1341.67	1491.67
TOTAL CURRENT ASSETS	7371428.67	7707357.67	7783786.67
PROPERTY AND EQUIP	4071500.00	4131500.00	4191500.00
LESS: ACCUM DEPRECIATION	420976.04	442477.08	464603.12
TOTAL LTA	3650523.96	3689022.92	3726896.88
TOTAL ASSETS	11021952.63	11396380.59	11510683.55
LIABILITIES:			
NOTES PAYABLE	55000.00	55000.00	55000.00
ACCOUNTS PAYABLE	2607600.00	2756440.00	2679650.00
ACCRUED EXPENSES	82050.00	73240.00	82850.00
ACCRUED TAXES	148375.00	248375.00	353375.00
TOTAL CURRENT LIABS	2893025.00	3133055.00	3170875.00
LONG TERM DEBT	150000.00	150000.00	150000.00
CAPITAL STOCK	10000.00	10000.00	10000.00
EARNED SURPLUS	7968927.63	8103325.59	8179808.55
TOTAL LIABILITIES	11021952.63	11396380.59	11510683.55

ENTER COMMAND OR END WITH CARRIAGE RETURN

***** END OF WORK *****

*** BALANCE SHEET FOLLOWS

A P P C O YEARLY BALANCE SHEET

1974

1973

ASSETS:

CASH	543000.00	409747.00
ACCOUNTS RECEIVABLE	5560000.00	5376647.00
LESS: BAD DEBT ALLOWANCE	0.00	37620.00
	-----	-----

NET ACCOUNTS RECV	5560000.00	5339027.00
INVENTORY	1430200.00	2033521.00
OTHER CURRENT ASSETS	0.00	1491.67
	-----	-----

TOTAL CURRENT ASSETS	7533200.00	7783786.67
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PROPERTY AND EQUIP	4016200.00	4191500.00
LESS: ACCUM DEPRECIATION	400100.00	464603.12
TOTAL LEA	3616100.00	3726896.88
	-----	-----

TOTAL ASSETS	11149300.00	11510683.55
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LIABILITIES:

NOTES PAYABLE	55000.00	55000.00
ACCOUNTS PAYABLE	2647600.00	2679650.00
ACCRUED EXPENSES	0.00	82850.00
ACCRUED TAXES	478500.00	353375.00
	-----	-----

TOTAL CURRENT LIABS	3181100.00	3170875.00
LONG TERM DEBT	150000.00	150000.00
CAPITAL STOCK	10000.00	10000.00
EARNED SURPLUS	7808200.00	8179808.55
	-----	-----

TOTAL LIABILITIES	11149300.00	11510683.55
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ENTER COMMAND OR END WITH CARRIAGE RETURN

OME

USER NOTE: DATA AVAILABLE FOR:

1973 1974

+++++ ENTER YEAR(S) TO BE DISPLAYED

1973 1974
-+ INCOME STMT FOLLOWS