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TEACHING A FINANCIAL PLANNING LANGUAGE AS THE PRINCIPAL COMPUTER LANGUAGE FOR MBA'S

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ABSTRACT

This paper describes the experiences at SMU in using a financial planning language (specifically, the Interactive Financial Planning System (IFPS)) as the primary computer language taught to MBA's. The language was introduced to extend the students' ability to solve business problems. Experiences with teaching the language, the extent of its use, and the results of a student survey are discussed.

INTRODUCTION

For a number of years, incoming MBA students at Southern Methodist University (SMU) had been taught to program in BASIC and to use a sophisticated calculator (such as the TI-58) as part of their first semester introductory management science and computer course. Part of the reason for the use of BASIC was that the SMU MBA program attracts large numbers of students with humanities and social science backgrounds. When a new chairman was brought in from outside the University at the end of the 1970's, he took the view that it was no longer appropriate to give graduate credit for learning BASIC at a time when many were learning the language in high school. The problem then was to redesign the computer portion of the course in a meaningful way.

It was, of course, clear that MBA students would be living in a computer environment after graduation and that they had to be prepared for it. It was also clear that the students should know more about computing than merely

putting data into canned programs. Teaching a more complex language than BASIC (e.g., Pascal) would accomplish little since it was not our objective nor that of the students to create professional programmers. What we wanted was a way of getting students to use the computer routinely as a natural means of solving complex problems and aiding in decision making.

The solution to our problem was to introduce a financial planning language into the introductory course and to propagate its use throughout the MBA program. In the following sections we describe the language chosen (the Interactive Financial Planning System, known by the acronym IFPS), the pedagogical advantages of using such a language, how the language was introduced into the curriculum, and the student acceptance of this approach.

WHAT IFPS IS

IFPS is a commercial software package designed by Execucom, an Austin, Texas firm, as a modeling language for financial planning. The original goal of the designers of IFPS was to provide a package that would allow firms to do probabilistic risk analysis. However, as the package took form, it became clear that its capabilities are much broader. The basic structure of IFPS is shown in Figure 1. From the user's point of view, IFPS is a package that operates on stored files which are written in the modeling language. Each file contains a collection of models, reports, and data files that can be retrieved, changed and, in the case of models, solved under a variety of conditions. Models represent programs, whereas reports contain formats for printout results. Datafiles can be called in the course of solving models.

Among the features of IFPS which are generally not available in conventional compiler languages are:

- natural language. Ordinary English names can be used with almost no restrictions on name lengths.

- order does not matter. IFPS is a non-procedural language. Such languages are not new (e.g., DYNAMO). The only restriction is that each variable has to appear once on the left side of a relation.

- spread sheet format. The user perceives the internal world of IFPS as consisting of a two-dimensional matrix. The rows of this matrix are the variables in the model; the columns represent the time periods. IFPS places a value in each cell to represent the value of the row variable during the column's time period.

- forward and backward movement in time. Commands are available that allow the use of values from previous and future time periods to be used in the computation of values for individual cells.

- "what if" capability. Built-in commands allow asking "what if" questions. These can be in the form of substituting alternative values or relations, sensitivity analysis, and goal seeking. The user thereby can quickly explore the implications of decision alternatives.

- simulation analysis. IFPS can be run in simulation mode, with variables being defined in terms of probability distributions. Thus, because of its column structure, IFPS is also a fixed-time interval simulation language.

- built-in functions. IFPS relieves the user of programming many of the tedious, repetitive calculations of finance and statistics by containing built-in functions for net present value, internal rate of return, depreciation, trend extrapolation, and many more.

Figure 2 shows a simple deterministic IFPS model and its solution. The decision problem being modeled involves introduction of a new product which will require an initial investment and will have certain variable costs

associated with it. Estimates of the market, the firm's market share, and the growth of these two quantities drive the values in the model. The financial functions express the measures of effectiveness. (The model shown in Figure 2 serves as the example used to introduce our students to IFPS.)

WHY IFPS WAS INTRODUCED

As stated in the introduction of this paper, we were seeking a way of getting students, particularly computer-naive students, to use the computer routinely as a natural means of solving problems and aiding in decision making. We therefore sought a language which:

1. is as close to the language of business as possible,
2. is easy for the student to learn quickly and to achieve succes in rapidly,
3. allows students to see and understand the underlying assumptions of their models, and
4. is likely to be related to the languages they would see after graduation.

We will now discuss each of these points in turn.

1. The many financial planning languages developed commercially during the 1970's were aimed at financial analysts and other corporate staff people. These people were interested in having the computer essentially speak the same language that they do. The designers of the successful financial planning languages understood that the style, format, and conventions of compiler languages such as BASIC introduced a psychological barrier to the use of the computer and had to be eliminated as much as possible. By making the planning languages conform to English and to the spread-sheets familiar from accounting practice, they gained rapid and widespread acceptance. Since, in our opinion,

a large portion of the business school experience is learning the language of business, financial planning languages are a natural choice to meet the first criterion.

2. From an instructional point of view, one of the primary attractions of the financial planning languages is the simplicity of the underlying conceptual model. This is particularly true for the financial planning languages that are non-procedural. Since the student can write down expressions one after the other in the order in which they occur in their thinking process, the models become easy to formulate and write. The simplicity of the language makes it possible for the student to write and solve a meaningful model after a single class period. Students, particularly computer-naive students, gain success quickly and, as a result, develop faith in their own ability to cope with the computer. The ability of students to learn the language quickly means that more class time can be devoted to the principles of modeling and to applications, thereby increasing the content of the course for the students.

3. Financial planning languages allow students to express their modeling assumptions clearly and explcitly. By stating their assumptions about input values and relationships in a clear form in the model, students can understand what the assumptions are. As G. R. Wagner states, they then "own" their assumptions (Ref.1).

4. Having decided on a financial planning language, we next sought to find one that was being widely used in business and was available to universities at reasonable cost with good support. We chose IFPS because it has a very large users group (over 1,000 organizations) and is available on a time sharing network commercially, as well as being used in over 60 universities around the country.

HOW IFPS WAS INTRODUCED

IFPS became operational on the SMU CDC-6600 in February 1980. Because of our MBA program's trimester schedule we were then in the middle of the second semester. We therefore used IFPS initially as a supplementary language. The 130 full-time MBA students (in 4 sections) were taking the production and operations management course. We developed a full 2-hour lecture that introduced the deterministic features of the language including the "what if" capabilities. This initial lecture centered around the example shown in Figure 2. Students were told to put this model up on the computer and to run a series of "what if" cases. Without exception, students were able to do this without difficulty. This lecture and assignment are now standard and give students the initial success they need with a new language.

We followed up this initial assignment with one requiring the students to write their own model. Toward the end of the semester, we brought IFPS in again, this time as a way of teaching simulation, which is part of the production and operations management course. IFPS proved to be an efficient way of getting students to write their own simulation models. One of the examples used is shown in Figure 3. A limitation, of course, is that the IFPS structure is set up for fixed time intervals and hence IFPS is not suitable for modeling next event situations such as are encountered in queuing situations. (But then, one can't have everything.)

Our initial success led the engineering school to introduce the language in their engineering economy courses. It also encouraged several students to undertake projects involving the use of the language and/or to do their homework in other courses, particularly finance, in IFPS.

In the Summer 1980 trimester we introduced IFPS into the first (introductory) course for the Executive MBA class and then into the first course for

the full-time group in the fall of 1980. These students received reinforcement in the language throughout the semester and then through the following semester as they took production and operations management. At this point, as in any changeover, we continued to teach both BASIC and IFPS. However, the student response we were receiving to IFPS was so enthusiastic that starting in the summer of 1981, we dropped BASIC and offered IFPS only. (As a backup, students were offered a separate 8-hour BASIC short course. Some 55 students paid $25 to take it.)

Of particular help was the creation of the SMU Student's Guide to IFPS. The IFPS Tutorial supplied by the vendor is designed more for commercial users than students. We felt we needed a simple "how-to" set of instructions that begin with how to get on the computer and obtain IFPS, how to write a simple model, how to use the editor to correct mistakes, how to get out of IFPS, etc. This initial portion of the Guide is essentially a life-support system for the beginning student. The second part of the Guide deals with the useful features of the systems (what if, built-in functions and subroutines, and Monte Carlo simulation). The third and final part covers special features (including data files, formatted reports and some specialized examples) designed for the students who wanted to go into the language more deeply. Figure 4 shows the table of contents of the Student Guide. Figure 5 shows the extremely simple model that we used as an example throughout the Guide and ties the various pieces together.

Today, all 350 MBA's (full-time, part-time, and executive) are taught only IFPS. At the undergraduate level, it is included in most management science electives. In engineering it is used in all engineering economy and production courses. During Fall 1981, IFPS was used for the first time in an economics course.

In summary, we have moved from providing the language as a supplement to relying on it as the primary way of teaching MBA students how to use the computer.

SURVEY RESULTS

To evaluate the use of IFPS as a teaching tool, full-time and Executive MBA students were surveyed at the end of the Fall 1981 semester. The questionnaire used is shown in Figure 6. It asks students about such factors as the student's background experience with computers prior to entering the MBA program, the difficulty they experienced in learning IFPS, and how well they had accepted IFPS as a tool which they could use outside the classes in which it was taught.

Two groups of students were surveyed, each with a different amount of exposure to IFPS. The first group (117 students) consisted of four sections of full-time and one section of part-time students who had just completed the course in which the language was introduced. The second group (19 students) were a section of Executive MBA students who had used the language for two semesters, the same introductory course and the follow-on production course.

Student Background

As anticipated, the survey showed that an appreciable number of the students entering the MBA program have some experience with a computer language. Of all the students surveyed, 60% indicated they had received instruction in at least one computer language prior to the course in which IFPS was introduced. Of these, 81% had programmed in BASIC, 46% had programmed in FORTRAN, and 11% had programmed in COBOL. Of the students with no prior programming experience, over half (52%) recalled experiencing "computer anxiety" prior to starting the program.

The Learning Experience

As the students began to use IFPS as a modeling tool, 34% rated it "easy" to learn; 46% rated it "somewhat hard" to learn. Only 20% found it "hard" or "very hard" to learn.

A common problem in the teaching of computer languages is that students tend to become attached to the first language they learn and resist efforts to introduce a second language. However, this phenomenon did not occur with the students surveyed. Of the 99 students who were able to compare their learning experience in IFPS with other languages, 67 indicated that IFPS was easier to learn. Twenty-eight found the learning experiences comparable, and only 4 found IFPS more difficult to learn.

As we expected, students in the advanced section tended to perceive themselves as more proficient in the language. In the group with two semesters of experience with IFPS, 47% rated themselves as having "intermediate" language skills; the remainder of this group rated themselves as a "novice." No student in either group felt that their skills had yet reached the "expert" level. It is interesting to note that in the group with only one semesters of exposure to IFPS, almost 25% described their IFPS language fluency level as "intermediate."

Most students (61%) felt that the IFPS Student Guide in its present form provided sufficient support for IFPS learning outside the classroom. Others expressed a need for more examples of the language features, possibly including cases and related IFPS models as an appendix. Another common suggestion was for more explanation of "what to do when you make a mistake." Some students commented that the availability of an "IFPS expert" teaching assistant in the terminal lab area would have been helpful.

IFPS Use Outside the Classroom

The survey showed that students with two semesters of exposure to IFPS tended to use it more as a personal tool, both for other courses and outside the classroom. In the group for which IFPS had just been introduced, only 9% reported using IFPS for homework in another course. In the more advanced group, however, over 52% used IFPS for other classes and projects.

A similar pattern was found in the students' use of IFPS as a tool for personal calculations or in a work environment. Of the students in the introductory course, 8% had used the language for personal use or on the job. In the Executive MBA section, however, over 68% indicated they had used IFPS for calculations other than classroom work.

IFPS versus Hand-held Calculators

When asked whether they felt instruction in the use of hand-held calculators or instruction in IFPS would be worth more to them for their short-term MBA experience, the students responded overwhelmingly (85%) in favor of the hand-held calculator instruction. We believe this to be a reflection of the methods of teaching in other courses in the program. When asked a similar question regarding the anticipated relative value of the two tools for the long term (in the next five years), 42% responded they felt the IFPS instruction would prove more valuable.

Perceived Future Computer Use

Most of the students anticipate using the computer as an everyday tool in the future. The survey showed that 80% plan to make use of the computer in business once they graduate.

It is interesting to note the students' perception of computer availability. Rather than the difficult-to-get-to computing power of an isolated

main-frame environment, almost two-thirds of the students surveyed said they plan to own a personal computer after graduation.

CONCLUSIONS AND FUTURE DIRECTIONS

This paper has reported the qualitative experiences with using a financial planning language as the principal language for MBA's. Survey data indicates overall satisfaction with the language after the first semester, and the ability of at least some students to use the language outside the course in which it is taught.

Based on our experience, IFPS and similar financial planning languages present a viable approach around which to structure MBA student interaction with the computer. Even students with no prior computer experience found the language easy to learn and apply to a wide range of problems. Since students can readily grasp the syntax of the language, instructional time can be better spent dealing with the principles of business problem analysis and solution. Less time is needed to describe how to represent the problem in a computer language.

In addition to being easy to learn, financial planning languages provide the student with a skill that he can apply directly upon graduation. Since very few of our students plan to become systems analysts or professional programmers, they generally have little need for procedural programming languages.

In the future, we plan to broaden the base of courses at SMU which use IFPS, including the required management science courses at the undergraduate level. Within the introductory MBA course we plan to reinforce IFPS instruction by including additional IFPS examples in the statistics and forecasting portions of the course.

We plan to survey the full-time MBA student group again at the end of the Spring semester and prior to graduation at the end of the summer semester. We anticipate finding a larger and larger percentage of students making more use of the computer as a problem-solving tool, both inside and outside of the classroom.

In general, our experiences with IFPS have been positive. The development of the Student Guide combined with documentation provided by Execucom (the software's creator) have made this a well-documented system. Students grasped the language quickly; we met very little resistance, even from students who were "programming experts" in languages such as FORTRAN or COBOL. Even that prodigious bastion of resistance to pedagogical change, the faculty, had its foundations shaken. Instructors actually became enthusiastic about using the language in their classes.

REFERENCES

1. Wagner, G.R., "Decision Support Systems: Computerized Mind Support for Executive Problems," Managerial Planning, September/October, 1980.

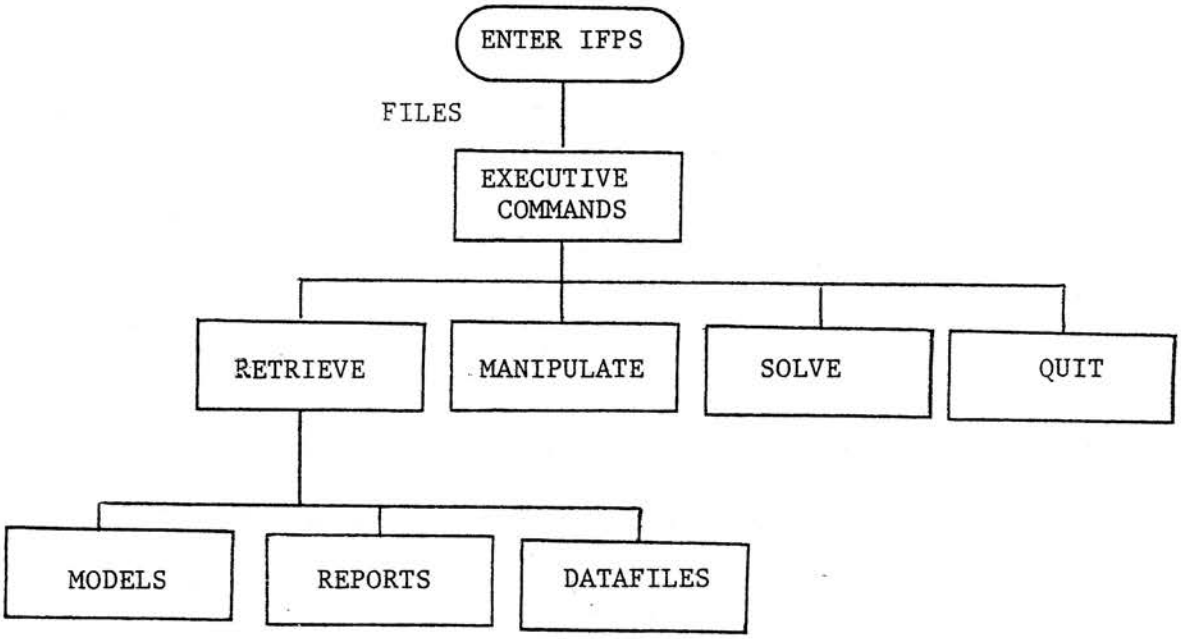


FIGURE 1. Basic structure of IFPS

```
MODEL DECIDE  VERSION OF  07/14/81  10:28
10 COLUMNS 1-8
20 *
30 *
40 *NEW PRODUCT MODEL
50 *
60 SALES VOLUME=MARKET*MARKET SHARE
70 MARKET=8000,PREVIOUS MARKET*1.03
80 MARKET SHARE=0.15,PREVIOUS MARKET SHARE +0.005
90 GROSS SALES =SALES VOLUME *UNIT PRICE
100 UNIT PRICE =2.5 FOR 4,2.75 FOR 4
110 OPERATING COST =SALES VOLUME *(PRODUCTION COST + OVERHEAD)
120 PRODUCTION COST =1.25 FOR 4,1.35
130 OVERHEAD = PRODUCTION COST *0.80
135 NET INCOME =GROSS SALES -OPERATING COST
140 INVESTMENT =2500,0
150 RATE OF RETURN = IRR(NET INCOME,INVESTMENT)
160 NET PRESENT VALUE=NPVC(NET INCOME,DISCOUNT RATE,INVESTMENT)
170 DISCOUNT RATE=.08
180 PERIODS 4
END OF MODEL
? solve
MODEL DECIDE  VERSION OF  07/14/81  10:28 -- 8 COLUMNS 13 VARIABLES
ENTER SOLVE OPTIONS
? all
```

	1	2	3	4	5	6
NEW PRODUCT MODEL						
SALES VOLUME	1200	1277	1358	1442	1531	1623
MARKET	8000	8240	8487	8742	9004	9274
MARKET SHARE	.1500	.1550	.1600	.1650	.1700	.1750
GROSS SALES	3000	3193	3395	3606	4209	4463
UNIT PRICE	2.500	2.500	2.500	2.500	2.750	2.750
OPERATING COST	2700	2874	3055	3245	3720	3944
PRODUCTION COST	1.250	1.250	1.250	1.250	1.350	1.350
OVERHEAD	1	1	1	1	1.080	1.080
NET INCOME	300	319.3	339.5	360.6	489.8	519.4
INVESTMENT	2500	0	0	0	0	0
RATE OF RETURN						
NET PRESENT VALUE	-2206	-1898	-1578	-1244	-799.2	-336.5
DISCOUNT RATE	.0800	.0800	.0800	.0800	.0800	.0800

	7	8
NEW PRODUCT MODEL		
SALES VOLUME	1719	1820
MARKET	9552	9839
MARKET SHARE	.1800	.1850
GROSS SALES	4728	5006
UNIT PRICE	2.750	2.750
OPERATING COST	4178	4423
PRODUCTION COST	1.350	1.350
OVERHEAD	1.080	1.080
NET INCOME	550.2	582.5
INVESTMENT	0	0
RATE OF RETURN	.1372	.3056
NET PRESENT VALUE	144.4	643.8

Figure 2. Introductory Example

```
MODEL MONTE  VERSION OF  12/15/80  16:22
10 COLUMNS 1981-1985
20 *
30 *RISK ANALYSIS MODEL USING SIMULATION
40 *
50 ENGINEERING DESIGN=TRIRAND(50000,60000,80000),0
60 MARKET SHARE=NORRAND(.1,.01)
70 SALES PRICE=UNIRAND(8.00,8.75)
80 TOTAL MARKET=1000000,PREVIOUS TOTAL MARKET*1.1
90 SALES VOLUME=MARKET SHARE*TOTAL MARKET
100 GROSS INCOME=SALES VOLUME*SALES PRICE
110 PRODUCTION COST=7.00 FOR 2,7.25
120NET INCOME =GROSS INCOME-SALES VOLUME*PRODUCTION COST-ENGINEERING DESIGN
140 INVESTMENT=100000,0
150 DISCOUNT RATE=0.15
160 PRESENT WORTH=NPVC(NET INCOME,DISCOUNT RATE,INVESTMENT)
170 RATE OF RETURN=IRR(NET INCOME,INVESTMENT)
180 TERMINAL VALUE=NTV(NET INCOME,0.08,INVESTMENT)
190 BENEFIT TO COST RATIO=BCRATIO(NET INCOME,DISCOUNT RATE,INVESTMENT)
END OF MODEL
? solve
MODEL MONTE  VERSION OF  12/15/80  16:22 -- 5 COLUMNS 14 VARIABLES
ENTER SOLVE OPTIONS
? monte carlo 300
ENTER MONTE CARLO OPTIONS
? freq,hist net income,freq present worth,none

                    FREQUENCY TABLE

     PROBABILITY OF VALUE BEING GREATER THAN INDICATED

              90      80      70      60      50      40      30      20      10

    NET INCOME
    1985 119665 131880 141705 151450 162114 172028 185967 201775 215354

    PRESENT WORTH
    1985 213807 243031 276531 296640 329297 359703 391085 437677 477330


                    SAMPLE STATISTICS

              MEAN    STD DEV SKEWNESS KURTOSIS  10PC CONF MEAN  90PC

    NET INCOME
    1985    165433      36647       .2      2.3      162725      168141

    PRESENT WORTH
    1985    337968     102044       .3      2.4      330427      345509


    HISTOGRAM FOR COLUMN      1985 OF NET INCOME
 31- 33                    *
 28- 30                    *
 25- 27              * * *       *
 22- 24          *   * * *   *   *
 19- 21          * * * * *   *   *
 16- 18          * * * * * * * * *   * *
 13- 15          * * * * * * * * * * * *
 10- 12          * * * * * * * * * * * *   *
  7-  9      * * * * * * * * * * * * * * *
  4-  6    * * * * * * * * * * * * * * * * * *
  1-  3  * * * * * * * * * * * * * * * * * * * *
         ----------------------------------------
               1     1     1     1     2     2
         8     '     3     6     8     1     3
         6     1     7     2     8     3     9
         2     7     2     7     2     7     2
         5     5     5     5     5     5     5
         0     0     0     0     0     0     0
START   82000.0  STOP  252000.0 SIZE OF INTERVAL   8500.00
```

FIGURE 3. IFPS Simulation Model

```
MODEL REPLACE  VERSION OF  01/26/81  21:31
10 COLUMNS 1-20
20*
30 CASH OUTFLOWS=NEW PRICE +NEW INSTALL-(OLD SALVAGE*(1-TAX RATE))
40 CASH INFLOWS = (NEW OPERATING SAVINGS-DEPRECIATION)*(1-TAX RATE)+NEW SALVAGE +
50STLINE DEPR(INVESTMENT,SALVAGE VALUE FRACTION,LIFE,DEPRECIATION,BOOKVALUE)
60 *
70 PRESENT VALUE=NPVC(CASH INFLOWS,.10,CASH OUTFLOWS)
80 RATE OF RETURN = IRR(CASH INFLOWS,CASH OUTFLOWS)
90 *
100*---INPUT DATA----
110*
120 NEW PRICE=40000,0
130 NEW INSTALL=3000,0
135 INVESTMENT=NEW PRICE +NEW INSTALL
140 OLD SALVAGE=1000,0
150 TAX RATE =.50
160 NEW OPERATING SAVINGS=9000
180 NEW SALVAGE=0 FOR 19,BOOK VALUE
190 SALVAGE VALUE FRACTION=1/43
200 LIFE=20
END OF MODEL
? solve
MODEL REPLACE  VERSION OF  01/26/81  21:31 -- 20 COLUMNS 15 VARIABLES
ENTER SOLVE OPTIONS
? all
```

	1	2	3	4	5	6
CASH OUTFLOWS	42500	0	0	0	0	0
CASH INFLOWS	5550	5550	5550	5550	5550	5550
DEPRECIATION	2100	2100	2100	2100	2100	2100
BOOKVALUE	40900	38800	36700	34600	32500	30400
PRESENT VALUE	-37455	-32868	-28698	-24907	-21461	-18328
RATE OF RETURN						
---INPUT DATA----						
NEW PRICE	40000	0	0	0	0	0
NEW INSTALL	3000	0	0	0	0	0
INVESTMENT	43000	0	0	0	0	0
OLD SALVAGE	1000	0	0	0	0	0
TAX RATE	.5000	.5000	.5000	.5000	.5000	.5000
NEW OPERATING SAVINGS	9000	9000	9000	9000	9000	9000
NEW SALVAGE	0	0	0	0	0	0
SALVAGE VALUE FRACTION	.0233	.0233	.0233	.0233	.0233	.0233
LIFE	20	20	20	20	20	20

	7	8	9	10	11	12
CASH OUTFLOWS	0	0	0	0	0	0
CASH INFLOWS	5550	5550	5550	5550	5550	5550
DEPRECIATION	2100	2100	2100	2100	2100	2100
BOOKVALUE	28300	26200	24100	22000	19900	17800
PRESENT VALUE	-15480	-12891	-10537	-8398	-6452	-4684
RATE OF RETURN		.0098	.0336	.0517	.0658	.0769
---INPUT DATA----						
NEW PRICE	0	0	0	0	0	0
NEW INSTALL	0	0	0	0	0	0
INVESTMENT	0	0	0	0	0	0
OLD SALVAGE	0	0	0	0	0	0
TAX RATE	.5000	.5000	.5000	.5000	.5000	.5000
NEW OPERATING SAVINGS	9000	9000	9000	9000	9000	9000
NEW SALVAGE	0	0	0	0	0	0
SALVAGE VALUE FRACTION	.0233	.0233	.0233	.0233	.0233	.0233
LIFE	20	20	20	20	20	20

	13	14	15	16	17	18
CASH OUTFLOWS	0	0	0	0	0	0
CASH INFLOWS	5550	5550	5550	5550	5550	5550
DEPRECIATION	2100	2100	2100	2100	2100	2100
BOOKVALUE	15700	13600	11500	9400	7300	5200
PRESENT VALUE	-3076	-1615	-286.3	921.6	2020	3018
RATE OF RETURN	.0858	.0930	.0988	.1036	.1076	.1109

```
---INPUT DATA----

NEW PRICE                      0        0        0        0        0        0
NEW INSTALL                    0        0        0        0        0        0
INVESTMENT                     0        0        0        0        0        0
OLD SALVAGE                    0        0        0        0        0        0
TAX RATE                   .5000    .5000    .5000    .5000    .5000    .5000
NEW OPERATING SAVINGS      9000     9000     9000     9000     9000     9000
NEW SALVAGE                    0        0        0        0        0        0
SALVAGE VALUE FRACTION     .0233    .0233    .0233    .0233    .0233    .0233
LIFE                          20       20       20       20       20       20

                              19       20


CASH OUTFLOWS                  0        0
CASH INFLOWS                5550     6550
DEPRECIATION                2100     2100
BOOKVALUE                   3100     1000

PRESENT VALUE               3925     4899
RATE OF RETURN             .1137    .1165

---INPUT DATA----

NEW PRICE                      0        0
NEW INSTALL                    0        0
INVESTMENT                     0        0
OLD SALVAGE                    0        0
TAX RATE                   .5000    .5000
NEW OPERATING SAVINGS      9000     9000
NEW SALVAGE                    0     1000
SALVAGE VALUE FRACTION     .0233    .0233
LIFE                          20       20

ENTER SOLVE OPTIONS
?
```

```
  model monte
READY FOR EDIT, LAST LINE IS 110
? list

MODEL MONTE  VERSION OF  12/29/80  14:55
10 COLUMNS 1-6
20 SALES=INITIAL SALES,PREVIOUS SALES* SALES GROWTH RATE
30 EXPENSES=75,PREVIOUS EXPENSES + 25 +FIXED EXPENSE GROWTH +VARIABLE EXPENSE GROW
40 NET INCOME=SALES-EXPENSES
50 *
60 *
70*
80 INITIAL SALES=TRIRAND(90,100,120),0
90 SALES GROWTH RATE=1.25*UNIRANDR(0.8,1.2)
100  FIXED EXPENSE GROWTH =UNIRAND(-2,4)
110 VARIABLE EXPENSE GROWTH=UNIRANDR(-3,1)
END OF MODEL
? solve
MODEL MONTE  VERSION OF  12/29/80  14:55 -- 6 COLUMNS 7 VARIABLES
ENTER SOLVE OPTIONS
? all

                               1        2        3        4        5        6

SALES                      103.3    129.2    161.5    201.8    252.3    315.3
EXPENSES                      75      100      125      150      175      200
NET INCOME                 28.33    29.17    36.46    51.82    77.28    115.3


INITIAL SALES              103.3        0        0        0        0        0
SALES GROWTH RATE          1.250    1.250    1.250    1.250    1.250    1.250
 FIXED EXPENSE GROWTH          1        1        1        1        1        1
VARIABLE EXPENSE GROWTH       -1       -1       -1       -1       -1       -1

ENTER SOLVE OPTIONS
? monte carlo 300
ENTER MONTE CARLO OPTIONS
? default freq,all
ENTER MONTE CARLO OPTIONS
? net income,none
```

FREQUENCY TABLE

PROBABILITY OF VALUE BEING GREATER THAN INDICATED

	90	80	70	60	50	40	30	20	10
NET INCOME									
1	20.12	22.37	24.25	25.93	27.23	29.03	31.01	33.58	37.63
2	3.9	11.6	16.5	22.1	26.8	32.4	37.2	41.9	52.2
3	1.3	10.0	17.0	23.5	30.9	39.1	48.5	58.1	72.3
4	-1.7	11.2	22.9	34.1	46.1	56.0	69.0	83.9	102.3
5	.6	22.0	34.1	49.0	68.6	82.2	102.0	125.2	150.7
6	10.3	36.2	58.3	79.5	98.3	120.9	148.6	181.6	219.8

SAMPLE STATISTICS

	MEAN	STD DEV	SKEWNESS	KURTOSIS	10PC CONF MEAN	90PC
NET INCOME						
1	28.13	6.352	.4	2.5	27.66	28.60
2	27.63	17.41	.2	2.4	26.35	28.92
3	34.34	27.38	.4	2.9	32.31	36.36
4	48.65	41.61	.6	3.6	45.58	51.73
5	73.81	59.60	.6	3.2	69.41	78.22
6	111.4	85.09	.7	3.3	105.2	117.7

```
ENTER POOL OR MODELING LANGUAGE COMMAND
? solve
ENTER SOLVE OPTIONS
? monte carlo 300
ENTER MONTE CARLO OPTIONS
? hist net income,none
```

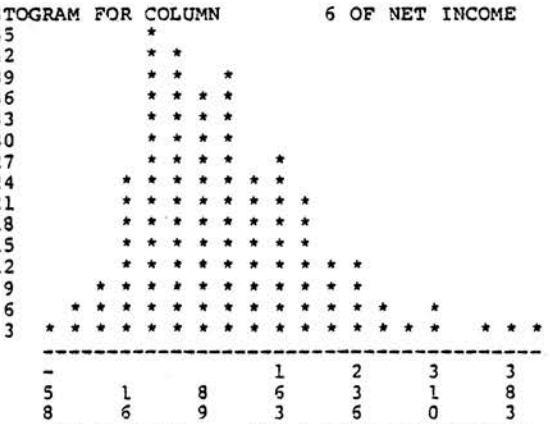
FREQUENCY TABLE

PROBABILITY OF VALUE BEING GREATER THAN INDICATED

	90	80	70	60	50	40	30	20	10
NET INCOME									
6	16.4	43.7	55.5	75.3	98.1	114.5	144.1	170.0	207.4

SAMPLE STATISTICS

	MEAN	STD DEV	SKEWNESS	KURTOSIS	10PC CONF MEAN	90PC
NET INCOME						
6	106.7	79.59	.8	4.1	100.8	112.6




```
START     -70.0  STOP     420.0 SIZE OF INTERVAL     24.50
ENTER POOL OR MODELING LANGUAGE COMMAND
?
```

CONTENTS

FIGURE 4. TABLE OF CONTENTS OF STUDENT GUIDE

PAGE

PART II. CONT.

PART III. SPECIAL CAPABILITIES AND SAMPLE PROBLEMS

```
10 COLUMNS 1-6
20 SALES = 100,PREVIOUS SALES *1.25
30 EXPENSES = 75,100,125,150,175
40 NET INCOME = SALES -EXPENSES
50 *
60 *                                    RATIO ANALYSIS
70 *PERCENT OF SALES
80 EXPENSE RATIO = EXPENSES/SALES
90 NET INCOME RATIO = NET INCOME/SALES
END OF MODEL
? solve
MODEL GRAY  VERSION OF  02/06/82  16:01 -- 6 COLUMNS 5 VARIABLES
ENTER SOLVE OPTIONS
? all
```

	1	2	3	4	5	6
SALES	100	125	156.3	195.3	244.1	305.2
EXPENSES	75	100	125	150	175	175
NET INCOME	25	25	31.25	45.31	69.14	130.2
			RATIO ANALYSIS			
PERCENT OF SALES						
EXPENSE RATIO	.7500	.8000	.8000	.7680	.7168	.5734
NET INCOME RATIO	.2500	.2000	.2000	.2320	.2832	.4266

```
ENTER SOLVE OPTIONS
?
```

FIGURE 5. Example Used In Student Guide

Figure 6.

IFPS QUESTIONNAIRE

We are surveying the MBA class about its responses to the use of the IFPS in the MBA program. We would appreciate your filling out this brief questionnaire. Thanks for your help.

T.E. Perkins and P. Gray

Do you consider yourself a novice___intermediate___expert___in IFPS?

Did you find it easy___somewhat hard___hard___very hard___ to learn IFPS?

Was the IFPS Student Guide sufficient support for learning the language?
Yes_____ No____
If not, please explain on the back of this page.

Have you used IFPS in any course other than MS&C (e.g., homework, class project, case analysis)? Yes____ NO_____

If yes, please describe on the back of this page what you used IFPS for and how often you have used it.

Have you ever created an IFPS model for personal use (e.g., personal finances, taxes) or as part of your job or as a research assistant to a professor? Yes____ No____

If yes, please describe on the back of this page.

Have you received instruction in another computer language either at SMU or elsewhere (include BASIC short course)? Yes____ No____

If yes, which languages: BASIC___FORTRAN___SPSS____ OTHER(specify)
_____

Did you find IFPS easier___same as___harder___to learn than other computer languages?

Do you expect to be using a computer after you graduate? Yess___No___

Do you expect to own your own personal computer? Yes___No___

As part of your MS&C course work you received instruction in both the use of the MBA calculator and modeling in IFPS. Which of these do you believe is worth more to you:

in the short term (while at SMU) MBA___IFPS____
in the long term (during next 5 years) MBA_____IFPS_____

Answer the following questions only if you did not have computer experience prior to coming to SMU:

Did you have "fear of computer" prior to coming to SMU? Yes___No___

If yes, have you overcome that fear? Yes___No___

Demographic Data:

Male_____Female_____

Year of Bachelor's Degree_____

No. of units of mathematics/statistics as undergraduate_____

MBA concentration:

Accounting_____Finance___International_____Marketing_____MS&C_____

Organizational Behavior_____Real Estate_____Other_____

Professor: Aronofsky_____Barr_____Perkins_____Sobol_____

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