JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

VII. INDUSTRY EDUCATIONAL COURSES - LONG TERM

A. EDUCARE

5. James A. Graaskamp EDUCARE Lecture Notes

Index

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Classroom Material for

EDUCARE - I

University of Wisconsin, 1971

PREMISE: A REAL ESTATE PROJECT IS AN ENTERPRISE AND THEREFORE A MANAGEMENT SYSTEM

SOURCE: Management Dynamics: The New Synthesis by John A. Beckett. McGraw Hill's Series in Management, 1971. New York.

I. Traditional Management Functions

A. The traditional functions of management imply a sequence of:

Planning
Organizing
Directing
Controlling

B. An American oil company has expanded the functions of management to be:

Environmental appraisal
Objectives development
Strategic planning
Demand forecasting
Logistics planning--Utilization
Logistics planning--Development and operations scheduling
Operations control

C. A similar but longer list of functions has been proposed by Marvin Bower, a well known management consultant:

Setting objectives
Planning strategy
Establishing goals
Developing a company philosophy
Establishing policies
Planning the organizational structure
Providing personnel
Establishing procedures
Providing facilities
Providing capital
Setting standards
Establishing management programs and operating plans
Providing control information
Activating people

II. A Systems Approach to Management Analysis

A. A revised list that does include some flavor of systems can be prepared. The elemental functions involved in man-made organizational undertakings might be listed like this:

Goal-setting
Forming policies
Searching for opportunities which are consistent with policies
Selecting opportunities which are consistent with policies
Constructing systems for capturing selected opportunities
Installing systems for capturing selected opportunities
Operating the systems that have been installed
Maintaining and continuously perfecting the operating systems

B. This list captures some of the flavor of systems thinking in that:

It contains the word systems in several places
It includes some of the feeling for the flow of events
It defines somewhat more clearly the idea of the interrelationships of activities
It expresses the presence of standards (in the form of policies) at one point
It even hints at the presence of feedback

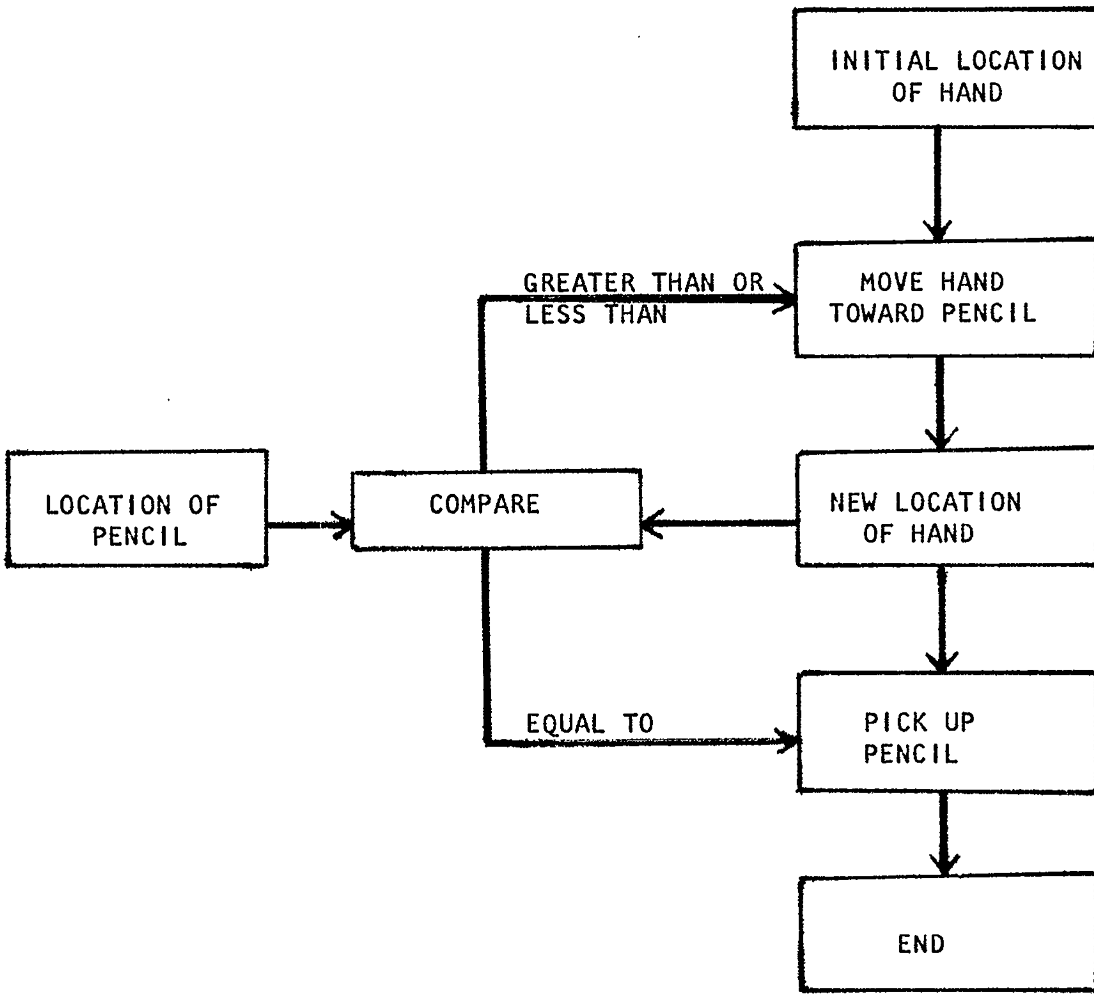
C. A careful look at these systems models will disclose that all systems have both structure and process that can be identified, if not completely isolated; they are comprised of:

Conditions in certain locations or with respect to certain factors at a given time. For example, the present position of the hand - its location at a given moment; the number of new cars on hand at a certain point in time. In systems parlance, these conditions are called levels, reservoirs, or states.

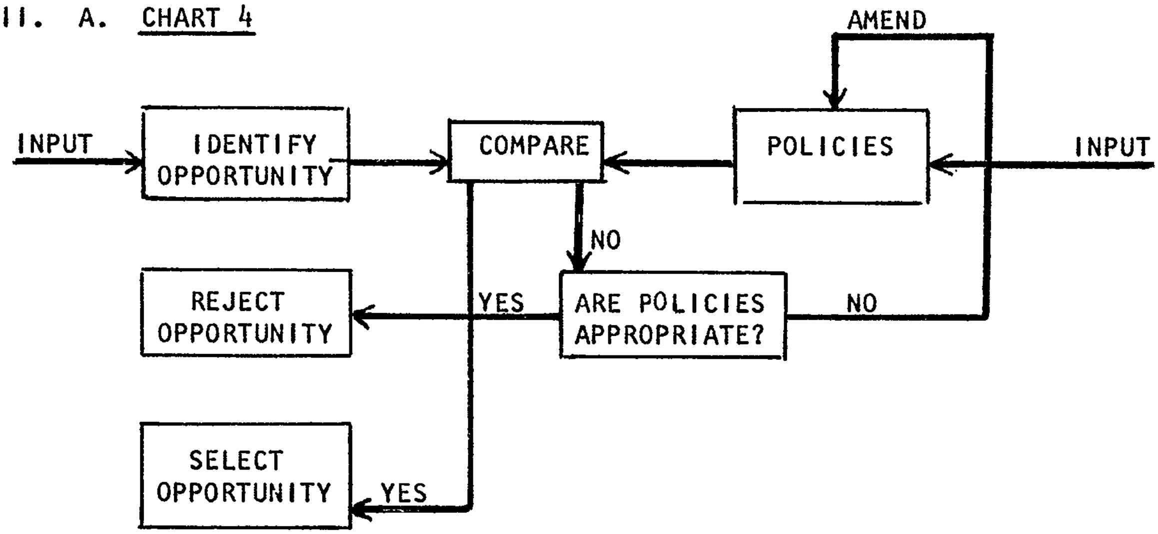
Action that occurs in moving the contents of one reservoir to another. For example, the movement of the hand from one position to another, the passage of light from the sun to the leaf, and the transfer of chlorophyl from the leaf to the tree. These are called flow rates.

Choices from among the alternatives available within the system. For example, a decision to continue to move the hand in the direction of the pencil, or a decision by the President of the United States to direct more federal government effort toward solution of problems in metropolitan areas, and less toward exploration of outer space. These are called decisions.

Lines of Communication that carry messages about states and flow rates and the actions that adjust their relationships to achieve some objective (or conform to some standard). For example eye-optic nerve-cerebellum connections that inform the motor centers of the brain of the present position of the hand with respect to the pencil and transfer information back to the nerve-muscle connections to bring the hand closer to the pencil. These are called information channels.


INITIAL LOCATION OF HAND
GREATER THAN OR LESS THAN
MOVE HAND TOWARD PENCIL
LOCATION OF PENCIL
COMPARE
NEW LOCATION OF HAND
EQUAL TO
PICK UP PENCIL
END

III. A. CHART 4



B. This whole process is more complex than a simple flow chart representation can depict, but the essence of the process can be discerned from such characterization as that shown in Chart 4; it is the beginning of a systems description of the management process.

This amended model, general though it is, recognizes the inputs to the system from other exogenous systems; characterizes the (circumscribed) whole as an integrated system; points out levels of states (policies, standards) within the system; identifies action points (decisions) within the system;
documents the interrelationships between actions and information storage points;
traces the flow of information
from outside the system
within the system
depicts the process as dynamic.

This model, supported by the explanations, is helpful in providing a basis for assessing the validity of common presumptions; it should provide fair warning that policy-making/opportunity-selecting cannot be adequately understood by simply viewing it as "a process that man performs through the act of decision-making."

C. Information plays the critical role in the process. To construct acceptable operating systems or models one must draw on information sources both inside and outside the decision making organization---a real estate enterprise.

Outside: Information about alternative kinds of operating systems that can be constructed to supplement

Inside: Existing knowledge and skills relating to the construction of operating systems;

Inside: Inside information about existing standards for constructing operating systems, which in turn, are the product of information flows that come in part from within the organization, to reflect its requirements, and in part from sources <u>outside</u> the organization.

D. As the movement of the system depends upon the external and internal inputs, the configuration and the behavior of a given system represent a negotiated consensus between two general sources of power---"the power of the environment to dictate the form and the behavior of the organization, on the one hand, and the power of the organization to decide for itself what its conformation and behavior will be, on the other. To be mindful of the inevitable presence of both forces is to be able to penetrate the meaning of organization purpose--- in every system, every organization."---John A. Beckett.

E. Compare this to the definition of feasibility:

"A real estate project is 'feasible' when the real estate analyst determines that there is a reasonable likelihood of satisfying explicit objectives when a selected course of action is tested for fit to a context of specific constraints and limited resources."---James A. Graaskamp

IV. A feasible solution depends on the degree to which you correctly define the problems. The critic or analyst or economic architect of a real estate system must attempt to "comprehend the nature and the degree of:

the dynamics of the organization (the subsystem);

the dynamics of the environment (the system);

the prevailing and potential power of the organization to exert its influence upon the environment;

the prevailing and potential power of the environment to exert its influence upon the organization;

the dynamics of the interrelationships between organization and environment.

To work effectively in such an environment one needs:

to comprehend the pattern within which all systems are combined;

to seek to identify the innumerable internal forces whose interplay among themselves and interaction with external forces may influence the formation of purpose;

to seek to identify the innumerable external forces which may influence the conformation and the behavior of the system organization with which the system designer is concerned;

to seek to measure the effects that will result from the interaction and the interplay of such internal and external forces under given conditions;

> to design the organization system in such a way that achievable alternative results (which have been selected from among them as purposes, objectives and goals) are, in fact, produced from the engineered combination of forces.

That the human being is limited in his ability to design the total of such interrelationships in the organizations which he builds should now be eminently clear. A great deal of the design of intersystem relations has already been taken care of by the interplay of forces that are either beyond the depth of his present understanding, or else beyond the reach of his influence, the grand design,(which was conceived and installed by some other power) inevitably confines the mortal systems architect. (Page 183 - Beckett)

LECTURE NOTES FOR EDUCARE SLIDE SET
May 1, 1973

Slide No.	Comment
#1	EDUCARE is the acronym for Educational Foundation for Computer Applications in the Real Estate Industry. At least this logo is cheaper than a neon sign.
#2	EDUCARE is a non-profit foundation organized in Wisconsin as a non-stock chapter 181 corporation to serve as a joint venture of: The American Society of Real Estate Counselors The Society of Real Estate Appraisers The American Institute of Real Estate Appraisers
#3	Its ultimate objective is to bring the computer terminal into everyday use...
#4	by appraisers and counselors in the field.
#5	The EDUCARE program has had three phases in its development: 1. The first step of the Foundation was to develop a program via contract through University of Wisconsin Foundation on the Madison campus using Professor Robert Knitter, director of the UW School of Business Computer Center, and Professor James Graaskamp of the School of Business Real Estate Department. 2. After testing and revising a course program, a seminar program was established by the Foundation with the assistance of the University of Wisconsin Extension on the Madison campus. While it was hoped that these courses would be self-supporting in the long run, it was anticipated by the directors that their innovative nature and costly format would involve Foundation underwriting of some operating deficit.

3. At the request of those who attended the early EDUCARE sessions, the Foundation created EDUCARE Network Inc., a taxable corporation operating as a cooperative of users to provide special contract benefits with GE Time Sharing and ongoing development of a library of programs, plus assistance in the excahnge of ideas among subscribers. Its working capital is provided by subscriber's deposits. Surplus, if any, is used to develop new programs or provide additional services to the subscriber. Membership is limited to those who have taken EDUCARE or designated professionals who have otherwise acquired command of GE Time Sharing techniques.

#6 The Foundation has six directors, with each member organization appointing two. The present directors are:

John S. Schneider, President; Atlanta, Georgia
Roy R. Fisher, Jr., Vice President and Secretary; Davenport, Iowa
Norman Benedict, Treasurer; Hamden, Connecticut
Robert A. Steele; Los Angeles, California
Ron Brown; Victoria, Texas
William E. Coyle, Jr., Pawtucket, Rhode Island

Each of the three professional societies advanced $10,000 and took back a note to fund the Foundation.

Operation and instruction of the program has been the responsibility of Professor Robert Knitter, Director of the U.S. School of Business Computer Center, and Professor James Graaskamp of the School of Business Real Estate Department. In addition the teaching staff consists of 10 additional professors and graduate students so that the student/teacher ratio can be as low as 3-1 during initial workshop sessions.

#7 The purpose of EDUCARE is to provide continuing education on the techniques, applications, and implications of the computer for the appraisal profession. The first step is classroom training...

#8 with hours of hands-on terminal time...

#9 plus preparation of manuals for further office training and terminal operation...

#10 plus ongoing technical advice on equipment and software by telephone, and terminal programs called MAILBOX and HELP! MAILBOX allows any subscriber to send written messages to any other subscriber through a special file system for the exchange of sales data, committee meeting dates or nonsense. New systems mean not only faster ways of doing the old things but new ways of answering client's questions better and with more professional presentation...

#11 so subscribers can rewrite the fundamentals of valuation practice that were carved in stone in the 1930's.

#12 Madison is in the center of a metropolitan area of 275,000 persons, the State Capitol, a finance center, a larger regional medical center than Rochester, Minnesota. It is served by Interstate 90 and 94 and three airlines, Northwest Orient, North Centeral, and Ozark.

#13 Bascom Hall is the sentimental center of the UW campus for 35,000 students on the shores of Lake Mendota.

#14 The EDUCARE program is held at Lowell Hall Center, a University owned and operated classroom and hotel facility combined,

#15 with outstanding food service served at the table...

#16 with an indoor swimming pool...

#17 with single rooms at $11 a night...

#18 but it's greatest advantage are the facilities for workshop teaching in sound-proof room for our terminals...

#19 connected to fully equipped classrooms. But the greatest resource of all is a staff of enthusiasts who are graduate students in real estate or computer science...

#20 like Dan Schwartz...

#21 or Al Hayes shown here with Phil Won of Hawaii...

#22 or Mike Robbins, lecturing here on computer mapping...

#23 or Professor James Graaskamp...

#24 or the Director of EDUCARE and resident guru on systems, Bob Knitter.

#25 The workshop format alternates a half hour lecture with a half hour of hands-on computer time. We rely on teams of two students for each terminal. We run from 8:30 A.M. until 10:00 P.M.. Each student is doing an Ellwood problem on the terminal 30 minutes after the start of the course on Sunday evening.

#26 The EDUCARE network on the GE Mark III Time Sharing system begins with your telephone...

#27 the network is available in 300 major cities in virtually every state in the U.S. and Canada (in pink) without dialing long distance.

#28 The basic link is a computer terminal such as this standard teletype unit with audio coupler for the telephone (in blue on the right) and the paper tape input option (the yellow puncher and reader on the right). This unit rents for approximately $65 a month including maintenance from a variety of vendors around the country.

#29 But the teletype is almost obsolete as innovations which increase flexibility and reduce costs arrive monthly, such as this Wang Model 1200, a typewriter, terminal and cassette storage set-up for about $225 a month. (The blond is a little extra)...

#30 or this wide-carriage GE Terminette 300 with cassette input and output...

#31 or this silent CRT display unit which can be had with a hard copy option...

#32 or this light 26 pount completely portable Execuport unit which can be purchased for about $2,000.

#33 Here is a partial list of programs for EDUCARE network including a variety of cash flow and discount models, an automatic market comparison system which uses the appraiser's own data in his own private data file and...

#34 accounting programs which tell him immediately by run, session, project, or by user how he has been spending the money in his office. Many EDUCARE subscribers itemize time on their invoices for computer time as a subtle advertisement as to their progressive sophistication. Many others came to EDUCARE only after their local Savings & Loans and Mortgage Companies said they were anxious to use computer analysis but did not know anybody in town who could do it for them.

#35 We presently have 70 appraisal firms throughout the country on EDUCARE Network. Several firms have sent half a dozen members each and any number of firms have sent both partners. Their monthly bills run from $30 to $500 a month not including rental of a terminal and most of this time has been billable to a client.

#36 EDUCARE already has an alumni group which held a three day advance seminar last fall to compare notes and learn new techniques. Here is Norm Benedict and John Shanahan with Alan Hayes. "Gee, things have changed a lot since we were last in school 6 months ago."

EDUCARE

DFAFT NUMBER 2, February 23, 1974

Curriculum Content for EDUCARE Course II

Purpose:

1. To introduce present EDUCARE users to new services and techniques available for Real Estate Analysis on computer terminal
2. To exchange and compare applications of the terminal as presently used in participant offices.
3. To permit users to evaluate present EDUCARE services and to indicate priority in the development in improved programs and services

Wednesday Evening, October 9: Organizational meeting following dinner:
To collect last minute examples for mimeograph and assign specific times for participant presentations of examples they brought along, etc.

Thursday morning, October 10: New EDUCARE models:
Land Development Models (2) Knitter
Development Economic Impact Model Robin/Mortenson/Graaskamp
Hotel/Motel Model Knitter/Graaskamp
New Minimod Mortenson

Thursday afternoon: A new tool:
GE's Financial Analysis Language (FAL) as a Modeling Tool Knitter

Thursday Evening: Case examples provided by EDUCARE members

Friday Morning, October 11: Availability of census tract data on computer terminal (Demonstration Case)
Demonstration of the MKT COMP features

Friday afternoon: Economic impact of computers on the appraisal office:
Individual participants' review of a questionnaire to be sent to all members of EDUCARE Network
Recent technology and its consequences for Network including GE System Changes, terminals, programable terminals and calculators
Review of current Network resources
What to eliminate
What to work on next (roundtable discussion)

Saturday morning, October 12: Participant demonstrations of applications and workshop

Saturday afternoon: University of Wisconsin football game

"Other Computer Applications to Appraisal"

I. Variations on the Cost Approach to Value

A. University of Wisconsin Architectural-Investment Model
1. Construction cost-revenue units
2. Marginal analysis of specifications
3. Marginal analysis of revenue groups
4. Seasonal anlaysis of revenue and cost

B. The Nika Corporation Cost-Estimating System
1. Central information bank for area comparisons
2. Alternate levels of detail appropriate to stage of project
3. Feedback for data bank
4. Feedback between cost estimating and project control system

C. Howze-Matic Tax Assessment System
1. Combination data bank and vluation system
2. Costing by exception
3. Combination of visual and quantitative data

D. Property Management Accounting Systems

II. Variations on Market Comparison Approach to Value

A. Community Growth Models
1. Projectron, an SMSA service by William R. Smolkin
2. 1970 Census data on tape analyzed by R.L. Polk and Company or Larry Smith and Company
3. General community growth models

B. Sales Transactions Data Banks
1. SREA Data Center Incorporated
2. Pacific Coast Real Estate Exchange
3. Realtron, Incorporated
4. Local multiple listing office data banks

C. Automated Market Valuation Systems
1. California County Tax Assessment Systems
2. University of California Los Angeles Appraisal Model by Professor Fred Case
3. Market Value Prediction Models based on regressions analysis (common to various university labs)
4. Market sales data banks and comparison models (such as University of Wisconsin Comparison Model)

D. Business Sales Volume Simulation Models
1. Holiday Inn Projection Model
2. Gasoline station valuation models based on regression coefficients
3. Accounting firm pro-forma projection models

EDUCARE - San Francisco

I. Mission:

A. To teach the significance of computer technology to the appraisal profession.

B. To ease the entry of the profession into computers by providing low cost training and advisory services through education.

C. To speed the use of comYputers in the field (slide 2)

D. In small classes of 30 - Mike Robbins lecturing on data banks from the earth satellite.

E. Daily experience on the terminal (Al Hayes and Phil Won)

F. One teaching assistant for every 3 or 4 students

G. Dan Swango and assistant looking for program bug

H. They found it!

I. Lo and behold cash flow output

J. A GE terminal with cassette feed instead of paper tape, wide carriage and audio coupler.

K. Typewriter type of keyboard so hunt and peck artist can become computer experts.

L. Cassette input and output device (market data files and comparable set)

M. Portatype - weighs 26#, can be used for negotiations right in the office.

N. CRT display units - this unit is being used to display sales data on Chicago market for an appraisal firm now - fast, flexible, hard copy option.

O. CRT display portable - 18# - screen size requires gen cutter eye

P. Graphic output device capable of drawing cash flow graphs, plot plans, blue prints, utility maps, etc.

II. New hardware imply the possibility of new systems. The three approaches to value are models of a decision process which attempts to answer the question what is fair market value. All models have a variety of limitations in practical use. To analyze the limitations of any decision model one should ask the following questions:

A. What decision needs to be made?

B. What data is available to make it?

C. What hypothesid is available to structure the data?

D. What are the limitations of the model user?

E. What are the constraints on communicating the output?

F. What is the cost/benefit ratio of using the model?

III. Computer technology has removed all of these constraints except the limitations of the analyst. Appraisal theory improvement depends on you learning more investment theory, more statistics, more about the revolution and real estate collection and management.

A. 50 apprasal offices are already making use of the computer in their office and EDUCARE Course II has already been scheduled so that these 50 can share their experiences,

B. EDUCARE is attempting to avoid partisan politics, the development of commercial enterprises which will compete with outstanding services such as Omnimetrics or Realmetrics, or any exclusiveness relative to ideas and services. The question is not does the computer have a use in an appraisal office. The question is how soon the independent appraiser can adapt to its potential.

C. High volume low price appraisal will soon be the monopoly of assessors and their data banks via automated appraisal systems. The low volume high fee business for sophisticated investors has already been lost to the CPA, the management consultant, and the engineer. How much will be left to the appraiser using present technique in 1980? Will you need a 50th anniversary meeting?

IV. Your materials kit includes a list of programs for the beginner which are on EDUCARE network, one such program is RATES which uses internal rate of return and adjusted internal rate of return for analysis.

A. Internal rate defined

B. Adjusted rate of return defined

C. After tax spendable

PRESENT VALUE CONCEPTS

I. CONCEPT OF PRESENT VALUE OR WORTH OF ONE DOLLAR

A. Example of the present value of a single year's return

1) Assumptions:
   a) $1,000 will be received at the end of one year
   b) Investment rate of return sought is 6%
2) Solution
   Unit of $1 at 6% was a conversion rate of .9434.
   .9434 x $1,000 = $943.40.
   Check: $943.40 x 6% = $56.60; $943.40 + $56.60 = $1,000.

$$\left(P = \frac{S}{(1+i)^n};\ \frac{\$1,000}{(1.06)^1} = \$943.40\right)$$

B. Example of the present value of a single payment to be received after several years

1) Assumptions:
   a) $20,000 will be received at the end of five years
   b) Investment rate of return sought is 7%
2) Solution
   Unit of $1 at 7% has a conversion rate of .7130.
   $20,000 x .7130 = $14,260

   Check: $\$14,260 \times (1.07)^5 = \$20,000$

II. CONCEPT OF PRESENT VALUE OF ONE DOLLAR PER ANNUM

A. Example of converting a series of identical or even net annual revenues into a present value

1) Assumptions:
   a) $1,000 will be received at the end of each of three consecutive years
   b) Investment rate of return sought is 6%
2) Solution
   Annuity of $1 per year for three years has a conversion rate of 2.673. 2.673 x $1,000 = $2,673

   Check:

Year 1 - .9434 x $1,000 =	$ 943.40
Year 2 - .8900 x $1,000 =	890.00
Year 3 - .8396 x $1,000 =	839.60
Total - Three Years	$2,673.00

COMPARISON OF CRITICAL VALUATION ASSUMPTIONS FOR THREE PRESENT VALUE VIEWPOINTS IN REAL ESTATE

Prepared for Discussion at EDUCARE Seminar

By Professor James A. Graaskamp

	Traditional Income Appraisal	Ellwood Valuation	Modern Capital Theory
1.	Instant investment	Instant investment	Discontinuous series of outlays
2.	Productivity limited to net income from parcel before debt and income tax.	Productivity limited to parcel after debt but before income tax.	Productivity is net change in spendable cash from all sources after debt and income tax traced to real estate.
3.	Continuous income function	Continuous income function	Discontinuous series of tax classified receipts
4.	Recapture from income	Recapture from income & resale	Payback of equity from spendable cash and debt from net revenue & resale.
5.	Projected for full useful life of improvements	Projected for normal turnover period 5-10 years of typical investor	Projected for elapsed time of outlays and receipts for specific investor time line horizon.
6.	Arbitrary discount factor	Weighted average Inwood discounting	Selected present value discounting based on characteristics of investor and property revenue pattern

COMPARISON OF CRITICAL ASSUMPTIONS FOR THREE VALUATION MODELS OR VIEWPOINTS IN REAL ESTATE

Prepared for EDUCARE
Madison, Wisconsin

By Professor James A. Graaskamp

Col. A Economic Allocation of Resources	Col. B Accept or Reject Loan Application or How Much to Lend?	Col. C Which Investment Has the Best Probability of Maximizing Net Spendable & Net Worth
1. Instant investment	1. Instant investment	1. Discontinuous series of outlays
2. Productivity limited to net income from parcel before debt and income tax	2. Productivity limited to parcel after debt but before income tax	2. Productivity is net change in spendable cash from all sources after devt and income tax traced to real estate.
3. Continuous income function	3. Continuous income function	3. Discontinuous series of tax classified receipts
4. Recapture from income	4. Recapture from income & resale	4. Payback of equity from spendable cash and debt from net revenue & resale.
5. Projected for full useful life of improvements	5. Projected for normal turnover period 5-10 years of typical investor	5. Projected for elapsed time of outlays and receipts for specific investor time line horizon.
6. Arbitrary discount factor	6. Weighted aferage Inwood discounting	6. Selected present value discounting based on characteristics of investor and property revenue pattern

ELLWOOD REVIEW AND MODELLING

I. The basic premise of the income approach to value is the algorithm I/C = value. The net income figure would appear to be a static quantity but over the years it has evolved into a concept of cash expectations from income in the first year.

   A. The simple algorithm was designed to teach to all in the real estate field a basic concept which was easy to use.

   B. Depending upon the sophistication of the appraiser, the client, and the market to which the value decision related, the shape of the income projection could be altered drastically but implicitly by the capitalization rate. (Refer to drawings on page______)

      1. Straight Line Method (income declines to nothing and reinvestment is ignored.)
      2. Hoskold's Method---Income declines more gradually as capital is reinvested.
      3. Inwood Method---Income remains level assuming reinvestment at the equity rate.
      4. Basic Ellwood Method---Income assumed level but recapture on resale varies. (Cash expenses include only average outlays for items with useful life shorter than projection with resale assumption accounting for deferred replacement items.)
      5. Ellwood Method with the J factor-Income can rise or fall in the same direction as recapture. (Implicitly cash expenses may be rising to meet outlays for cumulative deferred expenses.)

II. A refresher on third edition Ellwood using auxiliary table CY. (Refer to copy of pages 94-95 of Ellwood third edition)

   A. Notice salient fact number 4. While we do not know what rents and expenses will be in any following year, the solution presumes we know the <u>net increase</u> in net income and that this change will move in the same direction as resale value. Without this key simplification we cannot create a <u>table</u> of J factors to ease manual computation.

B. A second key assumption is the use of the Inwood table for equity discounting. It requires reinvestment as the same rate of the Y for the property but the choice to reinvest may not be in real estate nor may it be continuous.

1. Equity investments may be discreet with an adequate down payment accumulated only every three to five years with equity monies accumulating in intermediate securities in the meantime.
2. Inwood assumptions presume continuous and instantaneous reinvestment which may be true of money institutions but not of non-institutional equity investors.

C. Ellwood provides a devastating revolution in appraisal thinking by permitting recognition of the short term forecast, the impact of leverage, and precise application of the influence of multiple faceted financing of sales.

D. However, to simplify the educational problem of placing these tools in the hands of existing appraisers who do not have extensive mathematical training or computational equipment.it was necessary for Ellwood to provide a book of tables and manuals for relative simplicity application in the field.

E. Tables require that changing allocations between interest and principal, or debt service and cash dividends, or net worth and balance due on loans follow a mathematical pattern. Moreover, staging of investment or disinvestment must be eliminated to make possible a fixed point at which to begin and when measuring the time value of money as a single PV.

III. Electronic calculators remove the necessity of using tables if the user understands the sequence of steps by which he must make original computations. The computer terminal for which a library of programs is available makes it unnecessary for the user to understand the sequence of computational steps as the terminal will ask a question in the easiest syntax and convert the information to the sequence required for computation automatically.

A. If you remove the need to use tables in a field, then the original necessity of simplifying assumptions is also removed.

B. Instead the professional must determine which assumptions ideally serve the flow chart of analysis and decision steps for the problem at hand.

C. Next the professional must determine the marginal advantage in convenience and computational cost of alternative programmable analytical features in the ideal decision process.

D. Eventually if the professional changes the assumptions of his most sophisticated models, he must modify the method by which he teaches the basic algorithm of I/C = value so that the student can grow from the basic model to the most complex without a contradiction in terms somewhere along the way.

E. Among the change to basic assumptions which represent most sophisticated Ellwood will be:

1. Staging of investment and resale.
2. Erratic changes in gross rents, expenses, and interest amounts.
3. Stepped changes in income tax impact on value.
4. Alternative methods to Inwood for discounting and valuation which recognize reinvestment and opportunity preferences.

EQUITY RATE = EXP(Y)-1

WHERE:

Y= (LOG(X) - LOG(ORIGINAL INVESTMENT))/N

X= NET WORTH ON SALE - CAP. GAINS TAX ON SALE + W

$$W = \sum_{I=1}^{N} V_I \times (1 + CEQ)^{N-I}$$

V_I= (SPENDABLE CASH AFTER TAXES
+ TAX SAVINGS
- NET INVESTED CASH) FOR THE I-TH YEAR

CEQ= COST OF EQUITY CAPITAL RATE

N= NUMBER OF YEARS OWNED

PROCESS
(form)

/

STRUCTURE
(context)

$$V = \frac{I}{C} = \frac{NOI}{OAR}$$

1. Information available
2. Economic assumptions
3. Skill of user
4. Scope of client

OF CASH FLOW ANALYSIS

1. CASH RECEIPTS PER PERIOD
2. AFTER TAX CASH ACCOUNTING
3. DISCONTINUOUS INCOME FUNCTION
4. 5-10 YEAR PROJECTIONS
5. DISCONTINUOUS OUTLAYS
6. CAPITAL PAYBACK: INCOME, REFINANCING & SALE
7. OTHER PROFIT CENTERS, i.e. TAX SAVINGS OR UP-FRONT TAKE-OUTS

ECONOMIC ASSUMPTIONS

OF BASIC $I/C = V$

1. Economic rents
2. Accrual accounting
3. Level income
4. Projected for useful life
5. Instant investment
6. Capital recovered from income
7. No salvage

SKILL OF USER

1. professional STD. performance
2. education level of entry
3. effectiveness of cont'g education
4. rate of innovation acceptance
5. economic incentive
6. professional incentive

SCOPE OF CLIENT

- decision requiring appraisal
- knowledge of appraisal
- client vs report audience
- subjective vs [illegible] constraints
- fee vs risk control

OF ELLWOOD OAR

1. Economic rents
2. Cash accounting for "N" Periods
3. Continuous income function
4. 5-10 year projections
5. Instant investment
6. Capital recovered from income & sale
7. No income tax