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ABSTRACT

A bibliography that classifies and describes applications of management science methodology/philosophy to higher education administration is presented. Readily available materials and journal articles published mainly since 1972 are briefly described and coded using a taxonomy with five major dimensions: administrative level at which the methodology is applied; purpose of the model; program within a college; the technique used; and resources involved. An indication of whether the model was implemented is provided for each citation. Administrative level covers: federal and state governments, multicampus system, and campus. Purposes of the model are classified as: planning, budgeting, scheduling, resource allocation, obtaining resources, report generation, and evaluation. Program classifications include: general academic instruction; vocational/technical instruction; admissions, registration, records; departmental administration; executive management; and financial management. Technique categories include: mathematical programming, networks, simulation, multicriteria and classical optimization, stochastic processes, forecasting, decision support systems, and social science statistics. Resource categories include students, faculty, and financial. An index based on the taxonomy is included. (SW)

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# PREFACE

The following is an attempt to record and classify all recent published applications of management science techniques or ideas to the administration of higher education. Because the term "management science" means different things to different people, I have decided to define it in my terms as indicated by the taxonomy that is included with this bibliography. This taxonomy has been used to determine what references should be included and to classify them. Admittedly not everyone will agree with my decisions about what to include and exclude or how items should be classified. However, the taxonomy does provide a general frame of reference so that both researchers and administrators can easily determine what has been done in a given area as I have defined it.

As much as possible, I have tried to limit the contents of this bibliography to works that are readily available. The bibliography is meant to be used. It was my feeling that this use would occur more readily if the references were more easily obtainable from journals or other sources that one could find in most college or university libraries. Special reports and other works were included if I felt these could be ordered without great difficulty.

In keeping with the spirit of this bibliography it is my intention to update it annually. Thus I ask that the user take it as his or her responsibility to inform me of any additions that should be made. It is anticipated that these additions will be new works published during the preceding year. I in turn will respond by sending you an updated bibliography.

Finally, I owe a debt of gratitude to the many people who have taken time to comment on or add to this work. To this end, I acknowledge the

additional references that were brought to my attention by Nick Smith (Northwest Regional Education Lab), Ellis Page (Duke University), Lynn Barnett (ERIC), Lowell Yarusso (Arthur Andersen), Brent Wholeben (University of Texas at El Paso), and Ken Traynor (Clarion University of Pennsylvania). Many of those above also provided guidance with the taxonomy, as did Victor Richard (Burroughs), Hal Richard (Southern Illinois University), Carl Adams (University of Minnesota), and Larry Moore (VPI). I also owe a special thanks to two individuals who gave me an unusual amount of guidance and encouragement: Al Heinlein (Kent State University) and Bob Wallhaus (Illinois Board of Higher Education). In spite of all the help the preceding people gave me, there are still probably some errors and omissions. Those are totally my responsibility.

I would also like to thank Southern Illinois University for providing me with a sabbatical leave to perform this work and the Office of the President for providing additional funding to support its completion.

# A TAXONOMY FOR MANAGEMENT SCIENCE APPLICATIONS TO ACADEMIC ADMINISTRATION

I. Administrative Level (the level at which the model or technique would most likely be applied or used).

- A. Federal
- B. State
  1. State government (legislature, governor, etc.)
  2. Statewide coordinating or governing board for higher education
- C. Multi-Campus System
- D. Campus (University, Community College, State College, etc.). (For further breakdowns, see III. Program).

II. Primary purpose of the model. May include more than one of the following:

- A. Planning
  1. Long range/Strategic
  2. Medium range/Tactical
  3. Short range/Operational
- B. Budgeting
- C. Scheduling
- D. Resource allocation (e.g., assigning faculty to courses, computer time to departments, etc.)
- E. Obtaining resources (possibly from higher administrative levels)
- F. Report generation
- G. Evaluation

III. Program (NCHEMS Classification Structure)

- A. Instructional Programs
  1. General academic instruction
  2. Vocational/technical instruction
  3. Requisite preparatory/remedial instruction
  4. Departmental research
  5. Admissions, registration, records
  6. Support
     - a. A/V services
     - b. Instructional computing
     - c. Departmental administration
     - d. Course and curriculum development
- B. Organized Research Programs

C. Public Service Programs

D. Academic Support (Libraries, Academic Administration, etc.)
   1. Library services
   2. Hospitals and patient services
   3. Museums and galleries
   4. Academic administration (Dean level)

E. Student Service Programs

F. Institutional Support
   1. Executive management (V.P., Presidential level)
   2. Financial management
   3. General administration
   4. Faculty and staff auxiliary
   5. Public relations/development

G. Operation and Maintenance of Physical Plant

H. Independent Operations (Outside Agencies, etc.)

IV. Technique Used

A. OR/MS
   1. Mathematical Programming
   2. Simulation
   3. Networks
   4. Multicriteria Optimization
   5. Stochastic Processes
   6. Queuing Models
   7. Decision Theory
   8. Forecasting
   9. Fuzzy Sets
   10. Inventory Models
   11. Classical Optimization

B. MIS
   1. Systems Development
   2. Data Storage and Retrieval
   3. Information as a Resource

C. Decision Support System

D. Judgment

   1. Nominal Group
   2. Delphi

E. Social Science Statistics

F. Heuristic

V. Resources Being Dealt With

A. Students

B. Faculty

C. Staff

D. Facilities

E. Equipment

F. External Support
   1. Government
   2. Community
   3. Business and Industry

G. Financial

H. Time

# BIBLIOGRAPHY

AITKEN 82
Aitken, Norman D.
"College Student Performance, Satsifaction, and Retention: Specification and Estimation of a Structural Model"
Journal of Higher Education
53(1) ,(January/February) ,1982 ,32-50 ,

ADMIN. LEVEL: D PURPOSE: A2,A1 PROGRAM: E,A1,A5
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Unk
A four-equation model is developed that determines performance, satisfaction, and persistence based on several independent variables. These variables include attitudes toward college, dormitory arrangements, and others.

ANDERSEN83
Andersen, David F.
"A System Dynamics Simulation of Educational Finance Policies"
Simulation
40(6) ,(June) ,1983 ,227-240 ,

ADMIN. LEVEL: B2 PURPOSE: D,B PROGRAM: F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Test
Two simulation models are tested and their results compared for a school finance problem. Implications for development of simulation models are discussed.

ANDERSON81A
Anderson, Evan E. and Chung-ting, Shueh
"Modeling the Allocation of Graduate Student Financial Aid"
Decision Sciences
12(2) ,(April) ,1981 ,206-216 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: D4
TECHNIQUE: A1 RESOURCES: G IMPLEMENTED? Unk
A mathematical programming model is developed to determine how offers of financial aid should be allocated to graduate student candidates in order to maximize enrollment. It is shown that offers may exceed funds available since not all offers will be accepted.

ANDERSON81B
Anderson, John M. and Bernhard, Richard H.
"A University Examination-Scheduling Model to Minimize Multiple Examination Days for Students"
Decision Sciences
12(2) ,(April) ,1981 ,231-239 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A1,F3

TECHNIQUE: A1 RESOURCES: A,H IMPLEMENTED? Test
An assignment problem model is used to determine how exams should be scheduled to minimize the number of examinations a student must take on any one day. This model is solved using a branch and bound approach.

ANDREW 71
Andrew, Gary M. and Collins, Robert
"Matching Faculty to Courses"
College and University
46(2) ,(Winter) ,1971 ,83-89 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A1,A6c
TECHNIQUE: A1 RESOURCES: B IMPLEMENTED? Yes
The problem of assigning faculty members to courses is formulated as a transportation problem. It is shown how different weights can be given to faculty preference versus faculty effectiveness in certain courses.

ARBEL 83
Arbel, Ami
"A University Budget Problem: A Priority-Based Approach"
Socio-Economic Planning Sciences
17(4) , ,1983 ,181-189 ,

ADMIN. LEVEL: D PURPOSE: B,D,A2 PROGRAM: F1,F2
TECHNIQUE: E RESOURCES: G IMPLEMENTED? Test
Saatys (SAATY 83) Analytical Hierarchy Process is used to prioritize relevant budget considerations. This approach is compared to other methods for budgeting.

ATTEBERR79
Atteberry, Jim W.
"The Application of Mathematical Modeling to Vocational Education Planning"
Journal of Vocational Education Research
4(1) ,(Winter) ,1979 ,43-64 ,

ADMIN. LEVEL: B2 PURPOSE: A2 PROGRAM: A2
TECHNIQUE: A4 RESOURCES: A IMPLEMENTED? Test
A goal program is used to determine how many students should complete various programs to meet goals for placement, budget, etc.

BALDRIDG79
Baldridge, J. Victor and Tierney, Michael L.
New Approaches to Management: Creating Practical Systems of Management Information and Management by Objectives
San Francisco: Jossey-Bass Publishers, 1979
, ,1979 , ,

ADMIN. LEVEL: D PURPOSE: A PROGRAM: F1

TECHNIQUE: B RESOURCES: n/a IMPLEMENTED? Yes
Although this book is primarily a study of the results achieved by a set of universities that implemented various computerized planning models, it also provides considerable insight into the requirements for success in such an undertaking. Some of the models that were used include CAMPUS, and SEARCH.

BAYUS 82
Bayus, Barry L.
"On Practicing the Art of Modeling: The Guaranteed Student Loan Program"
Socio-Economic Planning Sciences
16(6) , ,1982 ,273-278 ,

ADMIN. LEVEL: A PURPOSE: A2,A1,D PROGRAM: H
TECHNIQUE: A11 RESOURCES: G IMPLEMENTED? No
This paper describes the preliminary development of an equilibrium model for the guaranteed student loan program administered by the Federal Government.

BEATTY 77
Beatty, George, Jr.
"The Application of Costing Methodologies in Higher Education"
in Hopkins, David S.P. and Schroeder, Roger G. (Eds.) New Directions for Institutional Research: Applying Analytic Methods to Planning and Management (No. 13) San Francisco: Jossey-Bass, 1977.
4(1) ,(Spring) ,1977 ,87-96 ,

ADMIN. LEVEL: D PURPOSE: A1,B PROGRAM: F2,F1
TECHNIQUE: A2 RESOURCES: B,C IMPLEMENTED? Yes
A cost model is described and several ways are shown that the model can be used. Simulation provides planning information for about future costs.

BESSENT 80
Bessent, E. Wailand and Bessent, Authella M.
"Student Flow in a University Department: Results of a Markov Analysis"
Interfaces
10(2) ,(April) ,1980 ,52-59 ,

ADMIN. LEVEL: D PURPOSE: A3 PROGRAM: A6c
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Yes
A Markov model is described that was used to determine how many students to admit to a doctoral program to avoid overloading the faculty. Five states were used for each student.

BIRNBAUM81
Birnbaum, Robert
"University Governance, Academic Bargaining, and Catastrophe Theory"
Review of Higher Education

4(2) ,Winter ,1981 ,1-21 ,

ADMIN. LEVEL: D PURPOSE: B PROGRAM: F1
TECHNIQUE: A RESOURCES: B,G IMPLEMENTED? Unk
A three dimensional model is developed based on catastrophe theory.

BLEAU 81A
Bleau, Barbara Lee
"Planning Models in Higher Education: Historical Review and Survey of Currently Available Models"
Higher Education
10(2) ,March ,1981 ,153-168 ,

ADMIN. LEVEL: D PURPOSE: E PROGRAM: F1,F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
This is a review of resource allocation planning models. CAMPUS, TRADES, and other models are examined in detail.

BLEAU 81B
Bleau, Barbara Lee
"The Academic Flow Model: A Markov-Chain Model for Faculty Planning"
Decision Sciences
12(2) ,(April) ,1981 ,294-309 ,

ADMIN. LEVEL: D PURPOSE: A1,B,G PROGRAM: F1,F2
TECHNIQUE: A5 RESOURCES: B IMPLEMENTED? Test
This paper extends the work of (HOPKINS 75) and (BLOOMFIE77) to include states for fixed term appointments and part-time FTEs. Applications to two university campuses are discussed.

BLOOMFIE77
Bloomfield, Stefan D.
"Comprehensive Faculty Flow Analysis"
in Hopkins, David S.P. and Schroeder, Roger G. (Eds.) New Directions for Instituitional Research: Applying Analytic Methods to Planning and Management (No. 13), San Francisco: Jossey-Bass, 1977.
4(1) ,(Spring) ,1977 ,1-18 ,

ADMIN. LEVEL: D PURPOSE: A2 PROGRAM: A6c,F1
TECHNIQUE: A5 RESOURCES: B IMPLEMENTED? Yes
A markov process model is used to forecast flow of faculty through various ranks. Results of this model are used to compute a "committed resources index" that can be used for institutional planning.

BLOOMFIE79
Bloomfield, Stefan D. and McSharry, Michael M.
"Preferential Course Scheduling"
Interfaces
9(4) ,(August) ,1979 ,24-31 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A1,A6c
TECHNIQUE: F RESOURCES: B IMPLEMENTED? Yes
After considering several mathematical formulations to assign faculty to courses and time periods, the authors decided to implement a heuristic method. The heuristic and its rationale are both discussed.

BLOOMFIE80
Bloomfield, Stefan D.
"Analysis of Academic Staffing Policies"
International Journal of Institutional Management in Higher Education
4(3) ,November ,1980 ,205-219 ,

ADMIN. LEVEL: D PURPOSE: A,G PROGRAM: F1,F2
TECHNIQUE: A2,A5 RESOURCES: B IMPLEMENTED? Yes
Markov models and simulation models are compared for analyzing academic staffing policies. Technical requirements, performance, and managerial usefulness are considered.

BLOOMFIE81A
Bloomfield, Stefan D. and Updegrove, Daniel A.
"A Modeling System for Higher Education"
Decision Sciences
12(2) ,(April) ,1981 ,310-321 ,

ADMIN. LEVEL: D PURPOSE: A,B PROGRAM: F1,F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
This paper describes some reasons why other large institutional models have not been widely used and discusses some applications of EFPM (UPDEGROV78).

BLOOMFIE81B
Bloomfield, Stefan D. and Updegrove, Daniel A.
"An International System for Financial Planning"
International Journal of Institutional Management in Higher Education
5(3) ,(November) ,1981 ,227-235 ,

ADMIN. LEVEL: D PURPOSE: A,B PROGRAM: F1,F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
A set of design characteristics are identified for a model that should be applicable to financial planning at any institution in any country. An application of the model at a university in Europe is discussed.

BOTTOMLE80
Bottomley, Wayne N., Linnell, Robert H., and Marsh, Herbert W.
"Differences in Cost, Tenure Ratio, and Faculty Flow as a Result of Changed Mandatory Retirement Ages"
Research in Higher Education

13(3) , ,1980 ,261-272 ,

ADMIN. LEVEL: D PURPOSE: A1,G PROGRAM: F1,F2
TECHNIQUE: A2,A5 RESOURCES: B,G IMPLEMENTED? Test
This paper describes the application of a model to determining the impacts of various retirement policies. The model itself is never described.

BOWLES 67
Bowles, Samuel
"The Efficient Allocation of Resources in Education"
Quarterly Journal of Economics
81(2) ,(May) ,1967 ,189-219 ,

ADMIN. LEVEL: B2,D PURPOSE: D PROGRAM: A1,F1
TECHNIQUE: A1 RESOURCES: G,B IMPLEMENTED? Unk
A linear programming model is developed to allocate resources among various levels in an educational system. These levels may range from elementary school to universities.

BOWLING 79
Bowling, Susan R. and Brakeman, Louis, F.
"Designing a Liberal Arts College for the Future: A Simulation Examining Future Change and Educational Values"
in Thorson, Esther (Ed.) Simulation in Higher Education, Hicksville NY: Exposition Press, 1979
, ,1979 ,25-40 ,

ADMIN. LEVEL: D PURPOSE: A1,G PROGRAM: F1
TECHNIQUE: D RESOURCES: n/a IMPLEMENTED? Test
This paper describes a group "simulation" that is designed to determine long range goals and objectives for a university. The Delphi technique is used in part of the process.

BRAUN 83
Braun, Thomas G.
"An Analysis of the Effects of Geographic-Demographic Factors on College Attendance"
Research in Higher Education
19(2) , ,1983 ,131-152 ,

ADMIN. LEVEL: B1,B2 PURPOSE: A1,A2,D PROGRAM: H
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Test
Factor analysis and cluster analysis are used to determine whether geographic origin influenced a student's decision to attend college.

BRUNO 69
Bruno, James E.
"A Mathematical Programming Approach to School Finance"
Socio-Economic Planning Sciences
3(1) ,(June) ,1969 ,1-12 ,

ADMIN. LEVEL: B2 PURPOSE: D PROGRAM: A1,A2,H
TECHNIQUE: A1 RESOURCES: G IMPLEMENTED? Test
A Model is developed to determine optimal levels for tuition, state funding, etc. and their allocation to various units of a state educational system. An example is given for junior colleges in a state.

BUCKLAND72
Buckland, Michael K.
"An Operations Research Study of a Variable Loan and Duplication Policy at the University of Lancaster"
Library Quarterly
42(1) ,(January) ,1972 ,97-106 ,

ADMIN. LEVEL: D PURPOSE: A2,D PROGRAM: D1
TECHNIQUE: A11 RESOURCES: D IMPLEMENTED? Yes
An actual implementation is described using a simple model to determine loan period and duplicate copy policies for library books. Implementation considerations are discussed.

CHORBA 83
Chorba, Ronald W. and Bommer, Michael R.W.
"Developing Academic Library Decision Support Systems"
Journal of the American Society for Information Science
34(1) ,January ,1983 ,40-50 ,

ADMIN. LEVEL: D PURPOSE: F,A,G PROGRAM: D1
TECHNIQUE: B2,C RESOURCES: D IMPLEMENTED? Unk
This paper describes an approach to the design of decision support systems for academic library management. Design and implementation considerations are discussed.

CRANDALL69
Crandall, Robert H.
"A Constrained Choice Model for Student Housing"
Management Science
16(2) ,(October) ,1969 ,B112-B120 ,

ADMIN. LEVEL: D PURPOSE: D,G PROGRAM: G,F1
TECHNIQUE: A1 RESOURCES: D,A IMPLEMENTED? Unk
A linear programming model is developed in terms of the level of "intensity" of use for each type of student housing. Implications of sensitivity analysis are discussed.

DEMBOWSK81
Dembowski, Frederick L.
"An Inventory-Theoretic Approach to School District Cash Management"
Educational Administration Quarterly
17(1) ,(Winter) ,1981 ,91-106 ,

ADMIN. LEVEL: C PURPOSE: A3,D PROGRAM: F2
TECHNIQUE: A11 RESOURCES: G IMPLEMENTED? Unk

Classical inventory models are used to optimize revenues received from investment of excess cash. Discussion centers on a secondary school system, but the concepts may be applicable to universities.

DOMER 82
Domer, D.E. and Johnson, A.E., Jr.
"Selective Admissions and Academic Success: An Admissions Model for Architecture Students"
College and University
58(1) ,(Fall) ,1982 ,19-30 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A5,A6c
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Test
Stepwise discriminant analysis was used to discriminate between students who succeed in an architectural program and those who do not. Measures used included GPA, high school class size and others.

DURSTINE69
Durstine, Richard M.
"In Quest of Useful Models for Educational Systems"
Socio-Economic Planning Sciences
2(2/3/4) ,(April) ,1969 ,417-437 ,

ADMIN. LEVEL: D PURPOSE: A2,A3 PROGRAM: A1,A5,F1
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Unk
This is one of the very early student flow models. Some interesting analyses are presented.

DYER 77
Dyer, James S. and Mulvey, John M.
"Computerized Scheduling and Planning"
in Hopkins, David S.P. and Schroeder, Roger G. (Eds.) New Directions for Institutional Research: Applying Analytic Methods to Planning and Management (No. 13) San Francisco: Jossey-Bass, 1977.
4(1) ,(Spring) ,1977 ,67-86 ,

ADMIN. LEVEL: D PURPOSE: C,D PROGRAM: D4,A6c
TECHNIQUE: A3,C RESOURCES: B,D IMPLEMENTED? Yes
With a network model at its core, a decision support system was developed to assist in assigning faculty to courses and courses to time periods. It is shown how the model can be used for planning purposes.

FEUERMAN73
Feuerman, Martin and Weiss, Harvey
"A Mathematical Programming Model for Test Construction and Scoring"
Management Science
19(8) ,(April) ,1973 ,961-966 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A1
TECHNIQUE: A1 RESOURCES: A IMPLEMENTED? Test

The knapsack problem is used to model the situation when students are given a test with more possible questions than the number they need to answer. Computational results are presented.

FITT 83
Fitt, Paul D.
"Reliable Record Matching for a College Admissions System"
Proceedings of the CAUSE National Conference, December 11-14, 1983, San Francisco, CA
,December ,1983 , ,

ADMIN. LEVEL: D PURPOSE: F PROGRAM: A5
TECHNIQUE: B2 RESOURCES: A IMPLEMENTED? Yes
A program was developed to merge national data on students with a college admissions database. The program checks for duplicates using several criteria.

FRANZ 81
Franz, Lori Sharp, Lee, Sang, M., and Van Horn, James C.
"An Adaptive Decision Support System for Academic Resource Planning"
Decision Sciences
12(2) ,(April) ,1981 ,276-293 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: F1,F2
TECHNIQUE: A4,C RESOURCES: G IMPLEMENTED? Test
A goal program is used as the basis of a decision support system that administrators can use to determine how resources should be allocated. Some goals are minimum salary increase, desired level of support staff, and utilization of faculty.

GAITHER 81
Gaither, Gerald H., Dukes, Fred O., and Swanson, John R.
"Enrollment Forecasting: Use of a Multiple-Method Model for Planning and Budgeting"
Decision Sciences
12(2) ,(April) ,1981 ,217-230 ,

ADMIN. LEVEL: D PURPOSE: A2,A1 PROGRAM: A5
TECHNIQUE: A11,E RESOURCES: A IMPLEMENTED? Yes
This paper describes a method for enrollment forecasting that relies on multiple models. At the institutional level, a cohort survival model is used to estimate the number of students available. Several regression models are used to determine enrollments at the departmental level.

GLOVER 72
Glover, Fred and Klingman, Darwin
"Mathematical Programming Models and Methods for the Journal Selection Problem"
Library Quarterly
42(1) ,(January) ,1972 ,43-58 ,

ADMIN. LEVEL: D PURPOSE: D,B PROGRAM: D1
TECHNIQUE: A1 RESOURCES: D IMPLEMENTED? Unk
This paper examines several models for determining which journals should be purchased by a library. Using surrogate constraints it is shown that the model may be simplified for solution by dynamic programming or modified to a general transportation problem.

GRAVES 71
Graves, Robert J. and Thomas, Warren H.
"A Classroom Location-Allocation Model for Campus Planning"
Socio-Economic Planning Sciences
5(3) ,(June) ,1971 ,191-204 ,

ADMIN. LEVEL: D PURPOSE: A2,A3,G PROGRAM: F1,G
TECHNIQUE: A1 RESOURCES: D,G IMPLEMENTED? Yes
This model considers classroom size, location preferences, and cost to optimally allocate facilities. The model can be solved as a linear program.

GRAY 80
Gray, Paul
"A Faculty Model for Policy Planning"
Interfaces
10(1) ,(February) ,1980 ,91-103 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1,A6c
TECHNIQUE: A2 RESOURCES: B IMPLEMENTED? Yes
This paper describes a computer-based model that uses probabilities of death, resignation, etc. to develop scenarios for future years under different policies. Each faculty member is tracked separately starting from the person's current status. A computer code in BASIC is available for purchase.

GREENHIL80
Greenhill, Craig J.
"Comparative Efficiencies in Projecting Faculty Rank Distribution"
paper presented to the Annual Forum of the Association for Institutional Research, April 27-May 1, 1980, Atlanta, GA
,April-May ,1980 , ,

ADMIN. LEVEL: D PURPOSE: A2,A3 PROGRAM: F1
TECHNIQUE: A8 RESOURCES: B IMPLEMENTED? n/a
Various faculty flow models are compared on the basis of data requirements, computational complexity, and results produced. Results indicate that more complex models produce better projections.

GRINOLD 77
Grinold, Richard C. and Marshall, Kneale T.



Manpower Planning Models
New York: Elsevier North-Holland, 1977
, ,1977 , ,

ADMIN. LEVEL: D PURPOSE: A PROGRAM: F1
TECHNIQUE: n/a RESOURCES: B,C IMPLEMENTED? Unk
Although ostensibly about manpower planning models in general, the focus of this book is on manpower planning models for universities. Examples are given for faculty and staff planning as well as enrollment forecasting.

GRINOLD 78
Grinold, Richard C., Hopkins, David S.P., and Massy, Willaim F.
"A Model for Long-Range University Budget Planning Under Uncertainty"
Bell Journal of Economics
9(2) ,(Autumn) ,1978 ,396-420 ,

ADMIN. LEVEL: D PURPOSE: A1 PROGRAM: F1,F2
TECHNIQUE: A1,A2 RESOURCES: G IMPLEMENTED? Yes
This paper extends the earlier work of Hopkins and Massy (HOPKINS 77C) to include uncertainty about inflation, return on endowment, and fund-raising. Various parts of the model are solved by mathematical programming methods while other parts are simulated.

HANDELMA81
Handelman, George H.
"Salary Raises by Percentage Increases"
Decision Sciences
12(2) ,(April) ,1981 ,322-337 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: A6c,D4,F2
TECHNIQUE: A11 RESOURCES: B,G IMPLEMENTED? Unk
A model is developed that determines salary levels in future years using a percentage increase each year. Implications for an individual are discussed.

HARDEN 71
Harden, Warren R. and Tcheng, Mike T.
"Projection of Enrollment Distribution with Enrollment Ceilings by Markov Processes"
Socio-Economic Planning Sciences
5(5) ,(October) ,1971 ,467-473 ,

ADMIN. LEVEL: D PURPOSE: A2,A3 PROGRAM: F1,A5
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Test
Markov models of student flow can encounter problems when projected enrollments exceed enrollment ceilings. This paper describes a way of avoiding those problems.

HARRIS 84

Harris, Donald E.
"The Use of Quantitative Information in Higher Education Decision Making"
CAUSE/EFFECT
7(4) ,July ,1984 ,20-24 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: F1
TECHNIQUE: n/a RESOURCES: n/a IMPLEMENTED? n/a
This paper discusses the results of research on institutions using computer-based planning models to determine how non-quantitative factors are incorporated.

HARTL 83
Hartl, R.
"Optimal Allocation of Resources in the Production of Human Capital"
Journal of the Operational Research Society
34(7) ,(July) ,1983 ,599-606 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: A1
TECHNIQUE: A11 RESOURCES: G,A IMPLEMENTED? Unk
Models are developed for determining how to best apply training so that learning will be maximized. A production function approach is used.

HILL 81
Hill, Robert R. and Wolf, Edwin M.
"Planning and Policy-Making for Tenure"
Simulation
36(1) ,(January) ,1981 ,13-26 ,

ADMIN. LEVEL: D PURPOSE: A1,A2,B PROGRAM: F2
TECHNIQUE: A5 RESOURCES: B,G IMPLEMENTED? Yes
Markov models are used to estimate the future effects that present tenure decisions will have on a university's budget.

HODGSON 82
Hodgson, P. and Chilvers, M.
"The Use of the SPSS Report Writer as a Management Information System"
Journal of Tertiary Educational Administration
4(1) , ,1982 ,27-41 ,

ADMIN. LEVEL: D PURPOSE: F PROGRAM: F1,F2
TECHNIQUE: B2,B3 RESOURCES: A,C,G IMPLEMENTED? Yes
The SPSS Statistical package contains software that can be used as an MIS. This paper describes such use as a historical data base on students, staff, and costs.

HOENACK 69
Hoenack, Stephen A.
"Efficient Allocation of Subsidies to College Students"
Socio-Economic Planning Sciences

2(2/3/4) ,(April) ,1969 ,503-512 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: E
TECHNIQUE: A1 RESOURCES: A,G IMPLEMENTED? Unk
The problem of allocating subsidies to college students is modelled as a mathematical program.

HOENACK 77
Hoenack, Stephen A. and Weiler, William C.
"A Comparison of Effects of Personnel and Enrollment Policies on the Size and Composition of a University's Faculty"
Journal of Higher Education
48(4) ,(July/August) ,1977 ,432-452 ,

ADMIN. LEVEL: D PURPOSE: A2,B PROGRAM: F1,D4
TECHNIQUE: A2,A5 RESOURCES: B IMPLEMENTED? Unk
This paper uses a Markov flow model for university faculty as the basis of a simulation model. The model generates output reflecting how enrollments will impact faculty size and composition.

HOFFMAN 83
Hoffman, Roslyn and Robinson, Lucinda
"Executive Decision Making: Using Microcomputers in Budget Planning"
Proceedings of the CAUSE National Conference, December 11-14, 1983, San Francisco,CA
,December ,1983 ,371-381 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1,F2
TECHNIQUE: C RESOURCES: G IMPLEMENTED? Yes
A microcomputer system was developed using spread sheet software to enable administrators to plan possible budget cuts under financial exigency.

HOLZMAN 75
Holzman, Albert G. and Johnson, Donald B.
"A Simulation Model of the College Admission Process"
Interfaces
5(3) ,(May) ,1975 ,55-64 ,

ADMIN. LEVEL: D PURPOSE: A3 PROGRAM: A5
TECHNIQUE: A2 RESOURCES: A IMPLEMENTED? Yes
A computer simulation program is developed to evaluate the impacts of various admissions policies. Results are presented in terms of expected numbers of rejections, dropouts, etc.

HOPKINS 71
Hopkins, David S.P.
"On the Use of Large-Scale Simulation Models for University Planning"
Review of Educational Research

41(5) ,(December) ,1971 ,467-478 ,

ADMIN. LEVEL: D PURPOSE: A,G PROGRAM: F1
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? n/a
This paper critiques the use of cost simulation models for university planning. Expense of use and the possible misuse of models are cited as some reasons for avoiding them.

HOPKINS 73
Hopkins, David S.P.
"An Analysis of University Year-Round Operation"
Socio-Economic Planning Sciences
7(2) ,(April) ,1973 ,177-187 ,

ADMIN. LEVEL: B2 PURPOSE: A2,C PROGRAM: A
TECHNIQUE: A6 RESOURCES: B,C,D IMPLEMENTED? Unk
This paper uses a queuing model to evaluate the financial impact of a university summer term. A cohort model (SUSLOW 77) is used to estimate attendance and enrollment patterns.

HOPKINS 74A
Hopkins, David S.P.
"Faculty Early-Retirement Programs"
Operations Research
22(3) ,(May-June) ,1974 ,455-467 ,

ADMIN. LEVEL: D PURPOSE: A2,G PROGRAM: F1,D4
TECHNIQUE: A5 RESOURCES: B IMPLEMENTED? Yes
A Markov flow model is used to analyze the impact of a university early-retirement program. An application to Stanford University is discussed.

HOPKINS 74B
Hopkins, David S.P.
"Analysis of Faculty Appointment, Promotion, and Retirement Policies"
Higher Education
3(4) ,(November) ,1974 ,397-418 ,

ADMIN. LEVEL: D PURPOSE: A2 PROGRAM: F1
TECHNIQUE: A5 RESOURCES: B IMPLEMENTED? Unk
This paper uses a Markov flow model with 17 possible states for a faculty member. The model is used to analyze the impact of various appointment, promotion, and retirement policies on a university's faculty.

HOPKINS 75
Hopkins, David S.P. and Bienenstock, Arthur
"Numerical Models for Faculty Planning"
in Allan M. Cartter (Ed.) New Directions for Institutional Research:

Assuring Academic Progress Without Growth (No. 6) San Francisco: Jossey-Bass, 1975.
2(2) ,(Summer) ,1975 ,23-48 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1,D4
TECHNIQUE: A5 RESOURCES: B IMPLEMENTED? Yes
A Markov process model is used to forecast the number of faculty in each of 17 possible states. These states represent academic rank, tenure vs. non-tenure, death, etc.

HOPKINS 77A
Hopkins, David S.P. and Massy, William F.
"Long-Range Budget Planning in Private Colleges and Universities"
in Hopkins, David S.P. and Schroeder, Roger G. (Eds.) New Directions for Institutional Research: Applying Analytic Methods to Planning and Management (No. 13) San Francisco: Jossey-Bass, 1977.
4(1) ,(Spring) ,1977 ,43-66 ,

ADMIN. LEVEL: D PURPOSE: A1,B PROGRAM: F1,F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
A long-range financial forecasting model is described. The model's development is discussed and it is shown how the model can be used to maintain equilibrium between income and expenses.

HOPKINS 77B
Hopkins, David S.P. and Massy, William F.
"A Model for Planning the Transition to Equilibrium of a University Budget"
Management Science
23(11) ,(July) ,1977 ,1161-1168 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1,F2
TECHNIQUE: A11 RESOURCES: G IMPLEMENTED? Yes
This paper describes the development and use of a transition model for obtaining budget equilibrium over the long run. The final result is 15 linear equiations in 19 unknowns. To solve the equations, four variables must be determined by the administrator.

HOPKINS 77C
Hopkins, David S.P., Larreche, Jean-Claude, and Massy, William F.
"Constrained Optimization of a University Administrator's Preference Function"
Management Science
24(4) ,(December) ,1977 ,365-377 ,

ADMIN. LEVEL: D PURPOSE: A2 PROGRAM: F1,D4
TECHNIQUE: E RESOURCES: A,B IMPLEMENTED? Test
This paper describes an experiment aimed at determining the preference functions for 19 university administrators. These derived preference functions were used to determine optimal levels for faculty and students.

HOPKINS 80
Hopkins, David S.P.
"Models for Affirmative Action Planning and Evaluation"
Management Science
26(10) ,(October) ,1980 ,994-1006 ,

ADMIN. LEVEL: D PURPOSE: A2,G PROGRAM: F1
TECHNIQUE: A5 RESOURCES: B,C IMPLEMENTED? Yes
This paper presents two models that can be used to set affirmative action goals and to evaluate progress toward those goals. A cohort model is used to predict staff attrition and a Markov process estimates the number of positions that can be occupied by women and minorities.

HOPKINS 81
Hopkins, David S.P. and Massy, William F.
Planning Models for Colleges and Universities
Stanford, CA: Stanford University Press, 1981
, ,1981 , ,

ADMIN. LEVEL: D PURPOSE: A,B,D PROGRAM: F1,F2
TECHNIQUE: n/a RESOURCES: G IMPLEMENTED? Yes
This book is a collection of models, mostly for financial planning, that have been developed at Stanford and elsewhere. The book is especially interesting because it provides some insight into the progressive development of the numerous models developed and used and Stanford.

JOHNSTON73
Johnstone, James N. and Philp, Hugh
"The Application of a Markov Chain in Educational Planning"
Socio-Economic Planning Sciences
7(3) ,(June) ,1973 ,283-294 ,

ADMIN. LEVEL: D PURPOSE: A2 PROGRAM: F1,D4
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? No
Although this paper describes a secondary school application, the Markov model developed is applicable to any situation involving student flow. The shortcomings of this approach are demonstrated and discussed.

KENDALL 81
Kendall, Kenneth E. and Luebbe, Richard L.
"Management of College Student Recruiting Activities Using Goal Programming
Decision Sciences
12(2) ,(April) ,1981 ,193-205 ,

ADMIN. LEVEL: D PURPOSE: D,B PROGRAM: F5
TECHNIQUE: A4 RESOURCES: G IMPLEMENTED? Yes
Goal programming is used to determine how funds should be allocated to various student

recruitment activities so that an enrollment goal will be reached.

KOCHEN 72
Kochen, Manfred
"Directory Design for Networks of Information and Referral Centers"
Library Quarterly
42(1) ,(January) ,1972 ,59-83 ,

ADMIN. LEVEL: B2 PURPOSE: A2,G PROGRAM: D1
TECHNIQUE: A11 RESOURCES: D IMPLEMENTED? Test
Some simple models are developed to evaluate the growth rate and effectiveness of information and referral centers in a library network.

KOENIG 69
Koegin, Herman E. and Keeney, Martin G.
"A Prototype Planning and Resource Allocation Program for Higher Education"
Socio-Economic Planning Sciences
2(2/3/4) ,(April) ,1969 ,201-215 ,

ADMIN. LEVEL: D PURPOSE: A,D PROGRAM: F1,F2
TECHNIQUE: A2,A5,C RESOURCES: A,B,D,G IMPLEMENTED? Unk
This paper describes what is essentially an early decision support system for university planning and resource allocation.

KORFHAGE72
Korfhage, Robert R., Bhat, Narayan U., and Nance, Richard E.
"Graph Models for Library Information Networks"
Library Quarterly
42(1) ,(January) ,1972 ,31-42 ,

ADMIN. LEVEL: B2 PURPOSE: A1,G PROGRAM: D1
TECHNIQUE: A3 RESOURCES: D IMPLEMENTED? nk
Concepts from graph theory are used to develop a library information network. Installation cost and reliability are considered.

LASSITER83
Lassiter, Roy L. Jr.
"The Development and Use of a Faculty Salary Model for Higher Education"
Research in Higher Education
18(3) , ,1983 ,333-358 ,

ADMIN. LEVEL: B2 PURPOSE: G PROGRAM: H
TECHNIQUE: E RESOURCES: B,G IMPLEMENTED? Yes
This paper describes the use of a regression model to determine whether sex discrimination was a factor in faculty salaries.

LEE 72
Lee, Sang M. and Clayton, Edward R.

"A Goal Programming Model for Academic Resource Allocation"
Management Science
18(8) ,(April) ,1972 ,B395-B408 ,

ADMIN. LEVEL: D PURPOSE: B,D PROGRAM: D4,A6c
TECHNIQUE: A4 RESOURCES: B,G IMPLEMENTED? Yes
A goal programming model is developed to determine the optimal allocation of salary money to instructional staff. Constraints such as accreditation requirements and number of graduate assistants are considered.

LEE 83
Lee, Sang M. and Van Horn, James C.
Academic Administration: Planning, Budgeting, and Decision-Making with Multiple Objectives
Lincoln, NE: University of Nebraska Press, 1983
, ,1983 , ,

ADMIN. LEVEL: D PURPOSE: A,B,D PROGRAM: F1,F2
TECHNIQUE: A4 RESOURCES: n/a IMPLEMENTED? Test
This book combines together the many applications of goal programming in academic administration. However, it also develops an overall goal programming approach for decision making in a university.

LEISTER 75
Leister, Douglas V.
"Identifying Institutional Clientele: Applied Metamarketing in Higher Education"
Journal of Higher Education
46(4) ,(July/August) ,1975 ,381-398 ,

ADMIN. LEVEL: D PURPOSE: A2,A3 PROGRAM: F1,F5
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Yes
Multidimensional scaling is used to identify an institution's location on student perceptual maps. Cost and prestige are used as dimensions.

LEVASSEU69
LeVasseur, Paul M.
"A Study of Inter-Relationships Between Education, Manpower, and Economy"
Socio-Economic Planning Sciences
2(2/3/4) ,(April) ,1969 ,269-296 ,

ADMIN. LEVEL: A PURPOSE: A PROGRAM: A1
TECHNIQUE: A2 RESOURCES: A,F,G IMPLEMENTED? Yes
A model developed by O.E.C.D. for national educational planning is discussed. This model was designed only for training in the use of models.

LEVINE 69
Levine, Sumner N.
"Economic Growth and the Development of Educational Facilities-II"

Socio-Economic Planning Sciences
2(2/3/4) ,(April) ,1969 ,513-515 ,

ADMIN. LEVEL: A,B PURPOSE: A PROGRAM: A
TECHNIQUE: A11 RESOURCES: D,B IMPLEMENTED? Unk
Several simple mathematical expressions are presented that can be used to relate rate of economic growth, etc. to the need for facilities and teachers.

LEWIS 83
Lewis, Mary Jo and Jacobs, Richard S.
"Progressive Planned Maintenance"
Proceedings of the CAUSE National Conference, December 11-14, 1983 San Francisco,CA
,December ,1983 ,393-403 ,

ADMIN. LEVEL: D PURPOSE: C,F PROGRAM: G
TECHNIQUE: B2,B3 RESOURCES: D,E IMPLEMENTED? Yes
A management information system was developed to maintain records concerning equipment. The system can produce reports concerning maintenance, costs, and scheduling.

MARSHALL70
Marshall, Kneale T. and Oliver Robert M.
"A Constant-Work Model for Student Attendance and Enrollment"
Operations Research
18(2) ,(March-April) ,1970 ,193-206 ,

ADMIN. LEVEL: D PURPOSE: A2,A3 PROGRAM: F3,A5
TECHNIQUE: A5,A11 RESOURCES: A IMPLEMENTED? Test
A model, based on Markov process ideas, is developed to predict the number of students who will graduate. The concept of a "work unit" and its completion is used to determine probability of dropping out or graduating.

MARSHALL79
Marshall, Kneale T. and Oliver, Robert M.
"Estimating Errors in Student Enrollment Forecasting"
Research in Higher Education
11(3) , ,1979 ,95-205 ,

ADMIN. LEVEL: D PURPOSE: A3 PROGRAM: F1,A5
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Unk
Historical student enrollment data are used to generate confidence limits for future enrollment forecasts through the use of a Poisson probability distribution.

MASLAND 84
Masland, Andrew T.
"Integrators and Decision Support System Success in Higher Education"

Research in Higher Education
20(2) , ,1984 ,211-233 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: F1,F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
This was a study to determine to what extent the success of EDUCOM's Financial Planning Model (UPDEGROV78) is a result of the organizational services that support its use. Results show the relationship is significant.

MASSY 76
Massy, William F.
"A Dynamic Equilibrium Model for University Budget Planning"
Management Science
23(3) ,(November) ,1976 ,248-256 ,

ADMIN. LEVEL: D PURPOSE: A1,B PROGRAM: F1,F2
TECHNIQUE: A11 RESOURCES: G IMPLEMENTED? Test
A deterministic model is developed that incorporates income, endowment, gifts, tuition, and institutional costs. Various solutions are discussed based on different possible objectives.

MASSY 81
Massy, William F., Grinold, Richard C., Hopkins, David S.P., and Gerson, Alejandro
"Optimal Smoothing Rules for University Financial Planning"
Operations Research
29(6) ,(November/December) ,1981 ,1121-1136 ,

ADMIN. LEVEL: D PURPOSE: A2,B PROGRAM: F2
TECHNIQUE: E RESOURCES: G IMPLEMENTED? Yes
The problem of deciding how much to pay out of a university's endowment each year is formulated as an optimal smoothing problem.

MAYHEW 83
Mayhew, William H.
"Computer-Supported Information Systems"
New Directions for Higher Education: Management Techniques for Small and Specialized Institutions (No. 42) San Francisco: Jossey-Bass, 1983.
11(2) ,June ,1983 ,65-71 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1
TECHNIQUE: B1 RESOURCES: n/a IMPLEMENTED? Unk
A fictional implementation of a computerized MIS at a small college is discussed. Key points are made regarding requirements for success.

MCCLURE 83A
McClure, Richard H. and Wells, Charles E.
"A Critical Survey of Mathematical Programming Models for Faculty Teaching Load Assignments"
Modeling and Simulation

14(4) , ,1983 ,1339-1342 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A6c
TECHNIQUE: A1 RESOURCES: B,H IMPLEMENTED? Yes
This paper compares several of the better known models for assigning faculty to courses.

MCCLURE 83B
McClure, Richard H. and Wells, Charles E.
"An Integer Programming Model for Faculty Course Scheduling"
Modeling and Simulation
14(4) , ,1983 ,1343-1347 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A6c
TECHNIQUE: A1 RESOURCES: B,H IMPLEMENTED? Yes
This describes the model of (MCCLURE 84) but presents somewhat more information about the utility rankings that faculty give to each schedule.

MCCLURE 84
McClure, Richard H. and Wells, Charles, E.
"A Mathematical Programming Model for Faculty Course Assignments"
Decision Sciences
15(3) ,(Summer) ,1984 ,409-420 ,

ADMIN. LEVEL: D PURPOSE: C,D PROGRAM: A6c
TECHNIQUE: A1 RESOURCES: B IMPLEMENTED? Test
Each faculty member is asked to rank according to preference a set of possible course schedules. A mathematical program is used to develop the departmental schedule that maximizes faculty preferences.

MCNAMARA71A
McNamara, James F.
"A Mathematical Programming Approach to State-Local Program Planning in Vocational Education"
American Educational Research Journal
8(2) ,(March) ,1971 ,335-363 ,

ADMIN. LEVEL: B2 PURPOSE: B,D PROGRAM: A2
TECHNIQUE: A1 RESOURCES: B,G IMPLEMENTED? Test
A model is developed for determining how resources should be allocated to various vocational education programs and then solved using a linear programming approach.

MCNAMARA71B
McNamara, James F.
"A Regional Planning Model for Occupational Education"
Socio-Economic Planning Sciences
5(4) ,(August) ,1971 ,317-339 ,

ADMIN. LEVEL: B2 PURPOSE: D PROGRAM: A1,A2,H
TECHNIQUE: A1 RESOURCES: G IMPLEMENTED? Test

A linear programming model is developed that uses demographic data to allocate state education funds. An application is discussed.

MCNAMARA71C
McNamara, James F.
"Mathematical Programming Models in Educational Planning"
Review of Educational Research
41(5) ,(December) ,1971 ,419-446 ,

ADMIN. LEVEL: n/a PURPOSE: n/a PROGRAM: n/a
TECHNIQUE: n/a RESOURCES: n/a IMPLEMENTED? n/a
This is a literature review that concentrates specifically on mathematical programming models. Different techniques (linear, nonlinear, integer, etc.) are discussed as well as the different types of problems that were modelled.

MEHTA 81
Mehta, Nirbhay K.
"The Application of a Graph Coloring Method to an Examination Scheduling Problem"
Interfaces
11(5) ,(October) ,1981 ,57-65 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: F3
TECHNIQUE: A1 RESOURCES: B,D,H IMPLEMENTED? Test
This paper describes the application of a graph coloring algorithm to the problem of scheduling examinations. A small case study is described.

MOHAMED 79
Mohamed, Dominic A.
"Application of Markov Chain Analysis to Planning Education for Work"
Journal of Industrial Teacher Education
17(1) ,(Fall) ,1979 ,57-63 ,

ADMIN. LEVEL: A PURPOSE: D,A2 PROGRAM: A2
TECHNIQUE: A5 RESOURCES: G IMPLEMENTED? Test
In this paper, Markov chains are used to model an entire nation's vocational education system. Numbers of graduates that will be required by various sectors of the economy are used to determine how financial resources for education should be allocated.

MONICAL 80
Monical, David G. and Schoenecker, Craig V.
"Marginal Funding: A Difference That Makes a Difference"
Research in Higher Education
12(1) , ,1980 ,67-82 ,

ADMIN. LEVEL: B2 PURPOSE: E PROGRAM: n/a

TECHNIQUE: A2 RESOURCES: F1 IMPLEMENTED? Test
An application of the NCHEMS SPS model to the state of Minnesota is described in which marginal funding is used to maintain resource levels in the face of declining enrollments. The rationale for this approach is to convince legislators to avoid tying funding to enrollment levels.

MOORE 84
Moore, Laurence J. and Greenwood, Allen G.
"Decision Support Systems for Academic Administration"
The AIR Professional File
No. 18 ,(Summer) ,1984 , ,

ADMIN. LEVEL: D PURPOSE: A3,E PROGRAM: F1
TECHNIQUE: A4 RESOURCES: A,G IMPLEMENTED? Yes
This paper describes a Decision Support System that was developed to assist middle or upper level administrators in allocating tuition increases among various student categories. The DSS is based on a goal programming formulation.

MORSCH 69
Morsch, William C. and Griest, Jeanne
"A Model for Manpower, Employment, Training and Education"
Socio-Economic Planning Sciences
2(2/3/4) ,(April) ,1969 ,225-250 ,

ADMIN. LEVEL: B,A PURPOSE: A1,A2 PROGRAM: A2
TECHNIQUE: A8 RESOURCES: A,D IMPLEMENTED? Unk
This paper describes the development of a forecast for employment in various sectors of the economy. This forecast can then be used to develop plans for vocational education.

MORSE 72
Morse, Philip M.
"Measures of Library Effectiveness"
Library Quarterly
42(1) ,(January) ,1972 ,15-30 ,

ADMIN. LEVEL: D PURPOSE: A3,B,D PROGRAM: D1
TECHNIQUE: A11 RESOURCES: D IMPLEMENTED? Unk
This paper develops a simple model to forecast book usage based on past experience. This model is used to make decisions about buying second copies or retiring books.

MOWBRAY 71
Mowbray, George and Levine, Jack B.
"The Development and Implementation of CAMPUS: A Computer-Based Planning and Budgeting System for Universities and Colleges"
Educational Technology
11(5) ,(May) ,1971 ,27-32 ,

ADMIN. LEVEL: D PURPOSE: A,B PROGRAM: F1,F2

TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
The development and use of the CAMPUS model are discussed. Some details of the model are presented briefly.

MULVEY 82
Mulvey, John M.
"A Classroom/Time Assignment Model"
European Journal of Operations Research
9(1) ,(January) ,1982 ,64-70 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: F3
TECHNIQUE: A3 RESOURCES: D,H IMPLEMENTED? Unk
A transshipment network model is combined with a scheduler's insight and a computer's search ability to select classrooms at time periods. The objective is to maximize classroom utilization.

NICHOLLS83
Nicholls, Miles G.
"A Markovian Evaluation of a Tertiary Education Faculty"
Higher Education
12(6) ,(December) ,1983 ,721-730 ,

ADMIN. LEVEL: D PURPOSE: A2,A1 PROGRAM: D4,F1
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Test
The Markov process is used to model student flow through a College of business.

OAKFORD 67
Oakford, Robert V., Allen, Dwight W. and Chatterton, Lynne A.
"School Scheduling Practice and Theory"
Journal of Educational Data Processing
4(1) ,(Winter) ,1967 ,16-50 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A5,F3
TECHNIQUE: A1 RESOURCES: A,B,D IMPLEMENTED? Yes
This paper describes the Stanford School Scheduling System. Although the system is designed for elementary and secondary schools, the discussion of theory behind the system may be useful to post-secondary education.

OECD 73
Organization for Economic Cooperation and Development
Mathematical Models for the Education Sector
(Paris: Organization for Economic Cooperation and Development: 1973)
, ,1973 , ,

ADMIN. LEVEL: n/a PURPOSE: G PROGRAM: n/a
TECHNIQUE: n/a RESOURCES: n/a IMPLEMENTED? n/a
This report describes the results of a worldwide survey to assess the use of mathematical models in academic administration. Results show a large gap between theory and practice.

OZATALAY82
Ozatalay, Savas, and Golin, Myron
"A Modular Decision Model for Higher Education Institutions"
Journal of Higher Education
53(1) ,(January/February) ,1982 ,75-92 ,

ADMIN. LEVEL: D PURPOSE: B,D PROGRAM: F2,F1
TECHNIQUE: A11,A2 RESOURCES: G IMPLEMENTED? Unk
This paper builds upon the Stanford equilibrium model (HOPKINS 77C) in developing a general decision model that can be used at any institution for obtaining a balanced budget over some fixed planning horizon. An example of the model's application is given.

PAGE 73
Page, Ellis B. and Breen, Thomas F. III
"Educational Values for Measurement Technology: Some Theory and Data"
in William E. Coffman (Ed.), Frontiers of Educational Measurement and Information Systems (Boston, MA: Houghton-Mifflin, 1973),
, ,1973 ,13-32 ,

ADMIN. LEVEL: A,B,DPURPOSE: G PROGRAM: A1,A2
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Unk
This paper describes in more detail than (PAGE 74) the way that subject matter learning is evaluated and the weights that may be assigned to different subjects.

PAGE 74A
Page, Ellis B.
"'Top-Down' Trees of Educational Values"
Educational and Psychological Measurement
34 , ,1974 ,573-584 ,

ADMIN. LEVEL: A,B,DPURPOSE: G PROGRAM: A1,A2
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Unk
This paper describes the development and use of a value tree for evaluating knowledge. The basis is a "bentee" or benefit T- score that can be used to determine overall education.

PAGE 74B
Page, Ellis B.
"Problems and Perspectives in Measuring Maturity"
in Donald E. Super (Ed.), Measuring Vocational Maturity for Counseling and Evaluation (Washington, DC: National Vocational Guidance Association, 1974)
, ,1974 ,68-79 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A1,A2,E

TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Unk
The application of decision trees and decision theory to the problem of evaluating vocational maturity is described.

PAGE 76A
Page, Ellis B., Jarjoura, David, and Konopka, Charles D.
"Curriculum Design Through Operations Research"
American Educational Research Journal
13(1) ,(Winter) ,1976 ,31-49 ,

ADMIN. LEVEL: D PURPOSE: A1,D PROGRAM: A6d,D4
TECHNIQUE: A1 RESOURCES: B IMPLEMENTED? Unk
This paper shows how dynamic programming may be used to determine what material to cover in a course or a series of courses. The concept is also applicable to courses in a program of study.

PAGE 76B
Page, Ellis B.
"The Optimization of Educational Values in Navy Curriculum Design"
Proceedings of the 1976 Annual Meeting, American Statistical Association, August 26, 1976, Boston, MA
, ,1976 , ,

ADMIN. LEVEL: D PURPOSE: D,G PROGRAM: A1,A2
TECHNIQUE: A1 RESOURCES: A IMPLEMENTED? Yes
This paper describes the application of dynamic programming to the design of a curriculum. Cost and educational values are both considered.

PAGE 78
Page, Ellis B.
"Operations Research as a Metaphor for Evaluation"
unpublished manuscript, University of Connecticut
, ,1978 , ,

ADMIN. LEVEL: n/a PURPOSE: G PROGRAM: A
TECHNIQUE: n/a RESOURCES: n/a IMPLEMENTED? n/a
Various operations research techniques are described and their possible applications in academic administration are discussed.

PLESSNER68
Plessner, Yakir, Fox, Karl A., and Sanyal, Bikas C.
"On the Allocation of Resources in a University Department"
Metroeconomica
20(3) ,(September-December) ,1968 ,256-271 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: A6c
TECHNIQUE: A1 RESOURCES: G,B IMPLEMENTED? Test
A linear programming model is developed to optimally allocate resources in a university department.

POPE 85
Pope, James A. and Evans, John P.
"A Forecasting System for College Admissions"
College and University
60(2) ,(Winter) ,1985 ,113-131 ,

ADMIN. LEVEL: D PURPOSE: A3,E PROGRAM: A5,F3
TECHNIQUE: C,A2 RESOURCES: A IMPLEMENTED? Unk
A decision support system is developed that can be used to forecast freshman enrollments based on data at various points in the admission process. It can also be used to simulate the effects of various policies on enrollments.

RAMSEY 81
Ramsey, Jerry D. et al.
"The Academic Affairs Information System: An Aid in Resource Allocation Decisions"
Texas Tech Journal of Education
8(3) ,(Fall) ,1981 ,189-203 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: F1,F2
TECHNIQUE: B3 RESOURCES: G IMPLEMENTED? Yes
The development of an information for resource allocation decisions is described. The MIS is designed for conditions of reduced enrollment, inflation, and increased competition.

RATH 68
Rath, Gustave J.
"Managment Science in University Operations"
Management Science
14(6) ,(February) ,1968 ,B373-B384 ,

ADMIN. LEVEL: n/a PURPOSE: n/a PROGRAM: n/a
TECHNIQUE: n/a RESOURCES: n/a IMPLEMENTED? n/a
This is one of the earliest reviews of management science applications to academic administration. While the bibliography is not extensive, the paper provides some useful ideas for classification of management science problems.

ROMERO 82
Romero, Bernardo P.
"Examination Scheduling in a Large Engineering School: A Computer-Assisted Participative Procedure"
Interfaces
12(2) ,(April) ,1982 ,17-24 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: F3
TECHNIQUE: B2 RESOURCES: D,H IMPLEMENTED? Yes
A computerized system is developed to assist in scheduling classrooms and times for final examinations. The computer is used to store and retrieve information to be used by the decision maker.

ROSENBER83
Rosenberg, Glenn R. and Peterson, William R.
"Computerizing the Budget Office: An On-Line Decision Support System"
Proceedings of the CAUSE National Conference, December 11-14, 1983, San Francisco, CA
,(December) ,1983 ,359-369 ,

ADMIN. LEVEL: D PURPOSE: B,F PROGRAM: F2
TECHNIQUE: B2,B3,A RESOURCES: G IMPLEMENTED? Yes
This paper describes a system developed for the University of Connecticut's Budget Office. Financial models and reports are discussed.

ROTHSTEI73
Rothstein, Marvin
"A Dynamic Programming Model for Periodical Selection"
Decision Sciences
4(2) ,(April) ,1973 ,237-246 ,

ADMIN. LEVEL: D PURPOSE: B,D PROGRAM: D1
TECHNIQUE: A1 RESOURCES: D,G IMPLEMENTED? Yes
An approach is presented for determining which periodicals should be kept in a reading room in order to maximize usage per dollar spent subject to budget limitations.

ROWE 85
Rowe, Fred A., Higley, H. Bruce, Larsen, Wayne, and Bills, Dale
"Developing a Predictive Equation for Admission at Brigham Young University Based on High School Preparation"
College and University
60(2) ,(Winter) ,1985 ,132-141 ,

ADMIN. LEVEL: D PURPOSE: E PROGRAM: A5
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Yes
A model was developed to test whether certain high school courses are better predictors of college success. It is shown that enrollment in certain "college prep" courses usually means a greater chance of success at BYU.

SAATY 83
Saaty, Thomas L. and Ramarujam, Vasudevan
"An Objective Approach to Faculty Promotion and Tenure by the Analytic Hierarchy Process"
Research in Higher Education
18(3) , ,1983 ,311-331 ,

ADMIN. LEVEL: D PURPOSE: D,G PROGRAM: A6c,D4
TECHNIQUE: E RESOURCES: B IMPLEMENTED? Unk
The Analytic Hierarchy Process is described and then used to prioritize various factors related to promotion and tenure. This model allows for consistent, objective decisions.

SCHINNAR78
Schinnar, Arie P.
"Sufficient Conditions for Maintaining a Balanced University Budget"
Management Science
24(14) ,(October) ,1978 ,1538-1541 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1,F2
TECHNIQUE: A11 RESOURCES: G IMPLEMENTED? Unk
This note is an extension of Massy's (MAS76) model for budget equilibrium. After formulating the model in matrix form, eigenvalues are determined that provide sufficient conditions for equilibrium.

SCHROEDE73
Schroeder, Roger G.
"A Survey of Management Science in University Operations"
Management Science
19(8) ,(April) ,1973 ,895-906 ,

ADMIN. LEVEL: n/a PURPOSE: n/a PROGRAM: n/a
TECHNIQUE: n/a RESOURCES: n/a IMPLEMENTED? n/a
This is a survey paper that covers all applications of management science to academic administration before 1973. An extensive bibliography, mostly reports, is included.

SINUANY-84A
Sinuany-Stern, Zilla
"A Network Optimization Model for Budget Allocation in a Multi-Campus University
Journal of the Operational Research Society
35(8) ,(August) ,1984 ,749-757 ,

ADMIN. LEVEL: C PURPOSE: B,D PROGRAM: F1,F2
TECHNIQUE: A3,A4 RESOURCES: G IMPLEMENTED? No
A network approach is used to allocate budget dollars among components of a multi-campus system over a period of several years. Simulation is used to generate cost predictions for the network model.

SINUANY-84B
Sinuany-Stern, Zilla
"A Financial Planning Model for a Multi-Campus College"
Socio-Economic Planning Sciences
18(2) , ,1984 ,135-142 ,

ADMIN. LEVEL: C PURPOSE: A1 PROGRAM: F2
TECHNIQUE: A2,A8 RESOURCES: G IMPLEMENTED? Yes
A long-range financial planning model is developed that projects enrollments and income. Its application to a multi-campus community college is discussed.

SMITH 71
Smith, R. Longworth
"Accommodating Student Demand for Courses by Varying the Classroom-Size Mix"
Operations Research
19(4) ,(July-August) ,1971 ,862-874 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A1,F3
TECHNIQUE: A5 RESOURCES: D,H IMPLEMENTED? Test
The problem of assigning courses to classrooms is tackled using probability arguments based on past enrollment history. The results of a test application and problems encountered are discussed.

SOYIBO 83
Soyibo, Adedoyin
"A Markov Chain Application to Academic Manpower Planning"
Advances in Management Studies
2(3) ,(July) ,1983 ,277-296 ,

ADMIN. LEVEL: D PURPOSE: A2,D,G PROGRAM: F2,F1
TECHNIQUE: A5 RESOURCES: B,C IMPLEMENTED? Test
A Markov chain model is used to forecast what impacts various manpower policies will have on a university's costs. A five year planning horizon is used and an example application is given.

SPINKS 84
Spinks, J.A. and Ho, D.Y.F.
"Chinese Students at an English-Language University: Prediction of Academic Performance"
Higher Education
13(6) ,(December) ,1984 ,657-674 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A5
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Unk
Several statistical methods are used to determine which factors are most relevant to predicting the academic success of a Chinese student in an english-speaking, western university.

SPINNEY 79
Spinney, David L. and McLaughlin, Gerald W.
"The Use of a Markov Model in Assessment of Alternate Faculty Personnel Policies"
Research in Higher Education
11(3) , ,1979 ,249-262 ,

ADMIN. LEVEL: D PURPOSE: A2,G PROGRAM: F1,D4
TECHNIQUE: A5 RESOURCES: B,G IMPLEMENTED? Test
A Markov flow model is used to analyze the impacts of various tenure and retirement policies on future faculty salary levels.

STAGE 82
Stage, D. and Yacopetti, P.
Management Information Systems in Higher Education
(Armidale, Australia: Institute for Higher Education, 1982)
, ,1982 , ,

ADMIN. LEVEL: D,C,BPURPOSE: A,F,G PROGRAM: F1,F2
TECHNIQUE: B1 RESOURCES: n/a IMPLEMENTED? n/a
This book describes how a management information system can be used in higher education and how it should be structured.

STEWART 84
Stewart, Ian and Johnson, F. Craig
"Applications of Nonlinear Models"
paper presented to the Annual Forum of the Association for Institutional Research, May 6-9, 1984, Fort Worth, TX
,(May) ,1984 , ,

ADMIN. LEVEL: D PURPOSE: D,G PROGRAM: F1,F2
TECHNIQUE: A1 RESOURCES: B,G IMPLEMENTED? Unk
It is shown how administrative decision problems can be formulated as nonlinear models. Special situations such as bifurcation, catastrophe, and maximum likelihood estimation are discussed.

SUSLOW 76
Suslow, Sidney
"Induced Course Load Matrix"
in Mason, Thomas R. (Ed.) New Directions for Institutional Research: Assessing Computer-Based Systems Models (No. 9) San Francisco: Jossey-Bass, 1976
3(1) ,(Spring) ,1976 ,35-51 ,

ADMIN. LEVEL: D PURPOSE: A3,A2 PROGRAM: F1,D4
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Yes
This paper describes the induced course load matrix, which forms the basis of many large simulations models.

SUSLOW 77
Suslow, Sidney
"Benefits of a Cohort Survival Projection Model"
in Hopkins, David S.P. and Schroeder, Roger G. (Eds.) New Directions for Institutional Research: Applying Analytic Methods to Planning and Management (No. 13) San Francisco: Jossey-Bass, 1977.
4(1) ,(Spring) ,1977 ,19-42 ,

ADMIN. LEVEL: D PURPOSE: A3 PROGRAM: A5,F1
TECHNIQUE: B3 RESOURCES: A,C IMPLEMENTED? Yes
This paper describes the use of a sophisticated data base to track each student through the university. Students who leave or leave and return are also tracked so that a persistence figure may be developed to project

student enrollments each semester.

TAFT 67
Taft, Martin I. and Reisman, Arnold
"Toward Better Curricula Through Computer Selected Sequencing of Subject Matter"
Management Science
13(11) ,(July) ,1967 ,926-945 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: A1
TECHNIQUE: F RESOURCES: H IMPLEMENTED? Unk
A heuristic algorithm is developed to sequence courses so that student learning is reinforced optimally.

TIMM 83
Timm, Neil H.
"Developing a Management Support System in Higher Education"
Planning for Higher Education
11(2) ,(Winter) ,1983 ,27-33 ,

ADMIN. LEVEL: D,C,BPURPOSE: A,F PROGRAM: F1
TECHNIQUE: B1 RESOURCES: n/a IMPLEMENTED? n/a
This paper describes the attributes of a successful Decision Support System and discusses how to implement one. No actual application is mentioned.

TOURON 83
Touron, Javier
"The Determination of Factors Related to Academic Achievement: Implications for the Selection and Counselling of Students"
Higher Education
12(4) ,(August) ,1983 ,399-410 ,

ADMIN. LEVEL: D PURPOSE: G,D PROGRAM: A5,E
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Test
Multiple regression was used to determine which educational and psychological factors had a greater impact on academic achievement.

TRACEY 83
Tracey, Terence J., Sedlacek, William E., and Miars, Russell D.
"Applying Ridge Regression to Admission Data by Race and Sex"
College and University
58(3) ,(Spring) ,1983 ,313-317 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A5
TECHNIQUE: E RESOURCES: A IMPLEMENTED? Test
It is shown that ridge regression performs as well as, if not better than, least squares in predicting scholastic success. GPA and SAT scores are used as predictors.

TRAYNOR 84
Traynor, Kenneth and Traynor, Susan C.
"Marketing the University: Theoretical Foundations and Applications"
Proceedings of the Midwest Conference, American Institute for Decision Sciences, May 2-4, 1984, Indianapolis, IN
,(May) ,1984 ,217-219 ,

ADMIN. LEVEL: D PURPOSE: A,G PROGRAM: F5
TECHNIQUE: E RESOURCES: n/a IMPLEMENTED? Yes
Multidimensional scaling is used to place colleges on a "perceptual map" based on the perceptions of students. This map can be used to determine how a college is viewed and who its direct competitors are.

TRIPATHY84
Tripathy, Arabinda
"School Timetabling -- A Case in Large Binary Integer Linear Programming"
Management Science
30(12) ,(December) ,1984 ,1473-1489 ,

ADMIN. LEVEL: D PURPOSE: C PROGRAM: F3
TECHNIQUE: A1 RESOURCES: A,B,D IMPLEMENTED? Test
The problem of class scheduling is formulated as a 0-1 integer programming problem. The solution method utilizes branch and bound combined with Lagrangean relaxation and subgradient optimization.

TROUTT 83
Troutt, Marvin D.
"Deciding Tuition Structure with Linear Programming"
Research in Higher Education
18(3) , ,1983 ,359-371 ,

ADMIN. LEVEL: D PURPOSE: A3,E PROGRAM: F1,F2
TECHNIQUE: A1 RESOURCES: B,G IMPLEMENTED? Unk
A linear programming model is developed to allocate tuition increases among various fees and programs. An example of the model's application is given.

UPDEGROV78
Updegrove, Daniel
"EFPM-The EDUCOM Financial Planning Model"
EDUCOM Bulletin
13(4) ,(Winter) ,1978 ,6-11 ,

ADMIN. LEVEL: D PURPOSE: A1,A2 PROGRAM: F1,F2
TECHNIQUE: A2 RESOURCES: G IMPLEMENTED? Yes
This model, which is a variation of Stanford's TRADES model, is described. The model forecasts income and expenses for a university.

VAUPEL 81
Vaupel, James W.
"Over-Tenured Universities: The Mathematics of Reduction"
Management Science
27(8) ,(August) ,1981 ,909-913 ,

ADMIN. LEVEL: D PURPOSE: D,G PROGRAM: F1,F2
TECHNIQUE: A11 RESOURCES: B,G IMPLEMENTED? Unk
This paper develops mathematical arguments to examine the effects of various ideas aimed at reducing the number of tenured faculty in a university.

VEMURI 82
Vemuri, Sheshagiri Rao
"A Simulation Based Methodology for Modeling a University Research Support Service System"
Socio-Economic Planning Sciences
16(3) , ,1982 ,107-120 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: B
TECHNIQUE: A2,A11 RESOURCES: C,D IMPLEMENTED? No
This paper models a university's research support service system, measuring effectiveness in terms of research time available, response time, and cost. Simulation is used to validate the model.

WARRACK 83
Warrack, Barry J. and Russell, C. Neil
"Forecasting Demand for Postsecondary Education in Manitoba"
Research in Higher Education
19(3) , ,1983 ,335-349 ,

ADMIN. LEVEL: B2 PURPOSE: A2,D PROGRAM: A1
TECHNIQUE: A8 RESOURCES: A IMPLEMENTED? Test
A motivational index and a demand index are developed to forecast the number of high school students who will go on to college. The validity of these models is tested.

WEHRUNG 78
Wehrung, Donald A., Hopkins, David S.P., and Massy, William F.
"Interactive Preference Optimization for University Administrators"
Management Science
24(6) ,(February) ,1978 ,599-611 ,

ADMIN. LEVEL: D PURPOSE: A2,B PROGRAM: D4,F1
TECHNIQUE: A1 RESOURCES: A,B,G IMPLEMENTED? No
A nonlinear programming probelm is developed that includes numbers of faculty and students, tuition level, etc. An iterative procedure is used so that an administrator may guide the optimization according to any desired preference function.

WHOLEBEN80
Wholeben, Brent Edward
The Design, Implementation, and Evaluation of Mathematical Modeling Procedures for Decisioning Among Educational Alternatives
(Lanham, MD: University Press of America, 1980)
, ,1980 , ,

ADMIN. LEVEL: B,C,DPURPOSE: A1,D PROGRAM: F1,F2
TECHNIQUE: A1 RESOURCES: D IMPLEMENTED? Unk
This book develops a model for the closure of elementary or secondary schools then shows how the model may be solved as either an integer programming or quadratic assignment problem. It may be applicable to post-secondary education, but in any case the models and techniques presented are interesting.

WHOLEBEN84A
Wholeben, Brent E.
"An Advanced Multiple Alternatives Modeling Formulation for Determining Graduated Fiscal Support Strategies . . ."
paper presented to the 1984 Annual Meeting of the American Educational Research Association, April 24, 1984, New Orleans.
,(April) ,1984 , ,

ADMIN. LEVEL: A,B PURPOSE: B,D PROGRAM: A,F
TECHNIQUE: A1 RESOURCES: G,D IMPLEMENTED? Unk
A conceptual model is presented for evaluating alternatives under fiscal crisis conditions. The model is framed in terms of elementary and secondary education but may be applicable to higher education.

WHOLEBEN84B
Wholeben, Brent E.
"Reducing Higher Education Budgets Through Multiple Alternatives Modeling"
paper presented to the 1984 Annual Meeting of the International Society of Educational Planners, October, 1984, New Orleans
,(October) ,1984 , ,

ADMIN. LEVEL: D PURPOSE: A,B,D PROGRAM: A,F1,F2
TECHNIQUE: A1 RESOURCES: G,B,C IMPLEMENTED? Unk
This paper is a more detailed version of (WHOLEBEN84A) that is oriented toward university decision-making under fiscal exigency. Solution of the model is not discussed in detail, although it appears that linear programming would be used.

WHOLEBEN84C
Wholeben, Brent E.
"Validating Multivariate Decision Modeling for Educational Planning"
paper presented to the 1984 Annual Meeting of the International Society of Educational Planners, October 1984, New Orleans
,(October) ,1984 , ,

ADMIN. LEVEL: B,C,DPURPOSE: B,D PROGRAM: F1,F2,A
TECHNIQUE: E RESOURCES: G IMPLEMENTED? Yes
Multivariate statistics are used to validate some results produced by the model of (WHOLEBEN84A). Although applied at the elementary and secondary level, the technique is applicable to mathematical modeling in general.

WOOD 79
Wood, R. Kent, Stephens, Kent G., and Barker, Bruce O.
"Fault Tree Analysis: An Emerging Methodology for Instructional Science"
Instructional Science
8(1) ,(January) ,1979 ,1-22 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A1
TECHNIQUE: A5 RESOURCES: A,B IMPLEMENTED? Test
Fault tree analysis is based on a tree structure that indicates where failures may occur and how likely they are to occur. This article shows its application to analyzing educational systems.

WORCESTE57
Worcester, Dean A. Jr.
"Standards of Faculty Tenure and Promotion: A Pure Theory"
Administrative Sciences Quarterly
2(2) ,(September) ,1957 ,216-234 ,

ADMIN. LEVEL: D PURPOSE: A2,D,G PROGRAM: A6c,D4
TECHNIQUE: A11 RESOURCES: B IMPLEMENTED? Unk
A non-quantitative conceptual model is used to demonstrate the relationships between various possible faculty reward systems and research/teaching activity of the faculty. This model is used to develop some cost considerations.

YUNKER 84
Yunker, James A. and Marlin, James W. Jr.
"Performance Evaluation of College and University Faculty: An Economic Perspective"
Educational Administration Quarterly
20(1) ,(Winter) ,1984 ,9-37 ,

ADMIN. LEVEL: D PURPOSE: G PROGRAM: A1
TECHNIQUE: A11 RESOURCES: B,A IMPLEMENTED? No
It is explained how a utility theory model can be used to optimize the use of student evaluations of faculty. However, actual use of the model requires extensive data collection.

ZABROWSK69
Zabrowski, Edward K.
"The Dynamod Model of Student and Teacher Population Growth"
Socio-Economic Planning Sciences

2(2/3/4) ,(April) ,1969 ,455-464 ,

ADMIN. LEVEL: A,B PURPOSE: A PROGRAM: A1
TECHNIQUE: A5 RESOURCES: A IMPLEMENTED? Unk
A large-scale Markov model is described that can be used to forecast numbers in the population who will reach various educational levels. The model contains some 832 transition probabilities.

ZEMACH 68
Zemach, Rita
"A State-Space Model for Resource Allocation in Higher Education"
IEEE Transactions on Systems Science and Cybernetics
SSC-4(2) ,(July) ,1968 ,108-118 ,

ADMIN. LEVEL: D PURPOSE: D PROGRAM: F1
TECHNIQUE: A2,A5 RESOURCES: B,C,D,E IMPLEMENTED? Unk
A model is developed to optimally allocate resources of staff, equipment, and facilities in a university. Simulation and Markov processes are both used.

ZUFRYDEN83
Zufryden, Fred S.
"Course Evalution and Design Optimization"
Interfaces
13(2) ,(April) ,1983 ,87-94 ,

ADMIN. LEVEL: D PURPOSE: A2,D,G PROGRAM: A1
TECHNIQUE: E RESOURCES: H,B IMPLEMENTED? Yes
Conjoint analysis was used to design a new course. Teaching method, content, etc. were all evaluated to determine their relative importance to students who might take the course.

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A.3. Requisite Preparatory/remedial instruction

None

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None

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A.6.b. Instructional Computing

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A.6.c. Departmental Administration

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