

CRITIQUE OF:

"MANAGEMENT SCIENCE IN UNIVERSITY OPERATION"

BURTON V. DEAN*

Case Western Reserve University

Rath presents an extensive summary of the actual and potential application of management science in assisting universities to find solutions to their management problems. Analysis of recent IFORS abstracts, the results of seventeen studies that have been reported, and the activities of several university research groups have produced the Rath synthesis. Few universities report significant work in applying management science to university operations.

An illustration of the conflict between managerial efficiency and freedom of choice may be seen in the following realistic examples of course scheduling, where, as Rath points out, there has been the greatest success.

University A efficiently registers students using a computer program scheduling procedure. All students register in one day by filling out all of the necessary forms. Then students are scheduled into sections, with no chance of expressing preference; subsequent changes are permitted with large penalty costs to discourage course switching. The computer has made the major allocation decisions using a form of the transportation method. But students have long resented this procedure by which they are placed in classes and with professors which they would not choose, given a freedom of choice. University administration, on the other hand, finds this procedure to be simple. The result is that such restrictive policies generate apathy or covert deviation from official procedures, and areas of conflict between administration, faculty, and students.

University B does not register its students for class for approximately fourteen days. During these days the student "shops around" and he may go to as many courses as he wants. After these fourteen days, he finally registers and selects courses and professors. Clearly, this procedure results in a greater cost of university operation and reduced classroom utilization. For example, the classes of some professors are overcrowded, and have to be shifted to larger classrooms, and considerable rescheduling of class times must be performed. Imbalance in class sizes exist, and additional teaching assistants may be required. However, establishment of flexible procedures, designed with the assistance of informed faculty involved in the system concerned, results in a more harmonious form of university environment, but with greater costs of operation.

The above examples indicate the difficulty in applying management science to university operations. Where the university is willing to accept a regulated pattern of student registration and course scheduling, the current state of the management sciences is adequate to derive reasonably efficient procedures.

A tabulation of some universities engaged in management science activities in university operations that are reported by Rath and that are known by this author are as follows:

University of California, (Berkeley, Irvine, and Los Angeles)
Carnegie Mellon University

* Acknowledgements are due Peter Knobloch and P. David Mitchell, Department of Operations Research, Case Western Reserve University.

Case Western Reserve University
University of Chicago
University of Colorado
Cornell University
University of Illinois
Indiana University
University of Iowa
University of Massachusetts
Massachusetts Institute of Technology
Michigan State University
University of Michigan
University of Minnesota
State University of New York
Northwestern University
Ohio State University
University of Oregon
University of Pittsburgh
Princeton University
Purdue University
Stanford University
Agricultural and Mechanical College of Texas
University of Texas
University of Toronto
Wayne State University
Yale University

The above list is only indicative, as most studies are not reported. Additional references may be found in Balinsky [1], Besel [2], Wright [5] and Goodlad, O'Toole and Tyler [4].

Although considerable evidence indicates that university groups are active in this area, it has been largely true that the major effort has been in applying the management sciences *to* university operations, rather than developing new areas of the management sciences *in* university operations. Considerable effort is required to implement what is already known in the behavioral sciences to developing realistic models of university operations. For example, only some of the effects of research in classroom instruction can be measured, as in Dean [3].

It would be rather easy to criticize the over-preponderance of effort being expended on computerized student registration and course scheduling, and to request that more effort be expended in other activities. For example, only the average costs of undergraduate education are known, whereas university accounting systems, in general, do not provide the necessary detail to provide realistic inputs to departmental decision models. Also, universities do not have sufficiently accurate ways of measuring outputs, and tend to substitute costs for benefits in evaluating performance.

Rath has evaluated the current state of research on university operations, quite accurately, I believe. In his paper he has raised three fundamental ques-

tions: "How is the individual student academically affected? How can specific groups of students be aided by education? How can the most effective dollar expenditures be achieved?" Rath has succeeded in itemizing the considerable effort being expended in the less fundamental issues. Our ability to apply management science to education still ranks with, or possibly below, Mark Twain's analysis of our ability to deal with the weather. Not only do we not do very much about the problem but when we say anything we don't really say very much.

References

1. BALINSKY, W., "An Annotated Bibliography on Operations Research in Education," Department of Operations Research, Case Western Reserve University, 1967.
2. BESEL, R. R., "Computers and Education—The State of the Art," Department of Operations Research, Case Western Reserve University, 1967.
3. DEAN, B. V., "Graduate Research as an Educational Tool," Department of Operations Research, Case Western Reserve University, Technical Memorandum No. 97, 1967.
4. GOODLAD, J., O'TOOLE, J. F., AND TYLER, L., *Computers and Information Systems in Education*, Harcourt, Brace and World, New York, 1966.
5. WRIGHT, G., "A Selected Annotated Bibliography on Educational Systems," Department of Operations Research, Case Western Reserve University, April 1966.