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Wayne Smith, Ph.D.

Wayne Smith is a Lecturer in the Department of Management at California State University, Northridge. He earned his Bachelor's Degree in Business and Economics from Cal State Northridge and his Ph.D. from Claremont Graduate University. He has worked and consulted in a variety of private and public sector organizations.

Consider 'decision support' software

Like most academics, I regularly attend academic conferences of interest. I also try to attend a few professional events each year, typically in the area of information systems and technology. Occasionally, I attend a vendor presentation or workshop as well. As a manager in a previous career, I attended many of these "dog-and-pony" shows; each vendor striving diligently to capture some fraction of my expenditure budget.

Last year, I attended one such half-day vendor presentation. This particular vendor sells several software applications that might be best labeled as "decision support" or "optimization" software. One of the key examples in the presentation was the scheduling of nursing staff at a regional hospital. The user enters data regarding goals (such as the number of general stations to be staffed) and constraints (such as skill levels, trauma/ER qualifications, time and vacation restrictions, pairing requirements, rotation assignments, etc.).

Using a sophisticated set of algorithms known as mathematical optimization, the application then generates an initial optimal schedule; that is, a schedule that best meets the goal while satisfying all of the constraints. From this schedule, the client can use a "drag-and-drop" interface to adjust the schedule in small ways as needed.

Though familiar with the theory and practice of optimization for large-scale industrial applications; to see an example application projected in real-time on a big screen reminded me of the very real limits of human working memory. Even a senior, experienced scheduler at a hospital would need some type of software to help with scheduling tasks.

The number of combinations and interactions among all of the various scheduling constraints exceeds an individual's capacity to *manage* the process, much less *optimize* the process. Business professionals are in constant need of reliable and valid decision-support models. Even such "routine" tasks such as scheduling, assignments, logistics, and transportation can benefit from optimization.

Smaller optimization models can be constructed using a contemporary spreadsheet application. Modeling functionality in a spreadsheet is often called a "solver." Larger decision-support models can require specialized software, such as described above. Some unique applications can require a combination of specialized software and even custom computer programming.

If you do not utilize optimization software in your business, you may want to consider investing in it. If you already utilize optimization software, it's always wise to re-evaluate based on current software developments.