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Modeling, Analysis and Spreadsheets: An Antidote for Dumb and Dumber

Rick Hesse, Feature Editor

As I think back on the history of teaching management science in business schools for the last 30 or so years I can't help but think how appropriate the movie title "Dumb and Dumber" is to describe the predicament of MS/OR in the business curriculum in the past. On top of that, I think that many of us in the profession then attempted to "dumb" down MS/OR in a vain attempt to keep modeling and analysis. I see signs of hope for the future, but the future of MS/OR in business schools is still precarious.

Dumb

Twenty-four years ago, I predicted the demise of management science in business schools if we as professors continued to teach math appreciation rather than problem formulation and analysis (Hesse, 1974). Now usually when I predict something, like who will win the Super Bowl, World Series, and so on, I'm never accurate. Unfortunately, this one prediction has turned out to be true. Having come from an education background in mathematics and engineering, I saw a real difference between how I was taught management science and how it was really used in business and industry. Unfortunately, even business schools were teaching management science as "math appreciation" rather than problem formulation and the analysis of results. Students would be so spent by the time they went through hand calculations of simplex tableaus that they couldn't see the forest for the trees. This was "dumb," and we in the profession have paid the price. When the AACSB relaxed the requirement of management science and included POM instead, we received the penalty for being "dumb." As a response, many professors (and accompanying textbooks) started stuffing LP, EOQ models, transportation and assignment models, and forecasting into their POM courses. In some cases they had to "dumb down" the solution techniques but at least they could still

torture students with the mechanics of solution. Long live the MODI and Hungarian methods, graphing two-dimension LP problems, and exponential smoothing (which sounds so esoteric). This insured that rigor would still be inflicted upon students (rather than analysis).

Dumber

With the development of PCs, there was a "dumber" rush to replicate main-frame programs without taking any advantage of visual input and output. While the computer could now do the work of simplex tableaus, students were still being tortured rather than simply having the computer present the solution to the models in an easy, readable form. Some programs even had 2-variable graphic solutions rather than forcing students to graph, etc. The sensitivity results were still presented in a mathematical context rather than moving forward to more useful output (Hesse, 1994a, 1994b). Computer screens and output simply replicated punched cards and mainframe jargon, making sure that $X(i,j)$ survived in some form or other.

The Dark (Middle) Ages

Next came the dark ages of management science. Students complained loudly about the amount of busy work in our classes, and the lack of application. It was not a hard thing for the rest of the faculty to vote that this required course be changed to an elective or simply completely eliminated, especially at the MBA level. Besides, weren't all the jobs (at least for undergraduates) in manufacturing anyway? I have no supporting data other than what the publishers say about the disappearance of management science courses in the business school curriculum, but it has been happening at an alarming rate. At least during this period of time, MS/OR textbooks were beginning to bring in real-world examples of practice



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and cost savings, but it was like sandbagging a river that was raging out of control. But the principle focus of these textbooks was the mechanics of algorithms, not the modeling or analysis of results.

Hope for Management Science

Just when things looked darkest, help came from an unexpected source. For me, I first noticed in 1983 that everything I had taught in a five-week session for MBAs in BASIC could be done on a spreadsheet in three weeks on a PC and that students could actually get usable results and be able to graph them! But it wasn't until a few years later that Frontline Systems introduced the add-in solver for Lotus 2.1 and that several pioneers in our profession saw the possibility of putting management science models on spreadsheets. Even then I remained skeptical, because there were some limitations that I didn't think spreadsheets could overcome. Don Plane of Rollins College was the first person I know that was attempting to put most management science models on spreadsheets and he won me over. Along with that came the idea that we could now present models, have the computer do the solution, and focus on analyzing the results instead of finding the solution.

Spreadsheets became a good platform for MS/OR models because students were becoming familiar with spreadsheets through finance and accounting, and thus the platform did not look intimidating. Spreadsheet use also became ubiquitous in the business world and quickly became parts of reports and presentations. As MBA students from business and industry came into part-time programs, they brought a heavy emphasis on spreadsheet use. The ability to do what-if analysis, to chart and

graph results so that numbers could be turned into pictures, all made spreadsheets a part of a manager's arsenal, and with the ability to do MS/OR models also, only strengthened their skills.

Interfaces is now the premier journal for presenting several good business and industry applications to the world every other month and shows that indeed management science is useful. Some of the applications are actually spreadsheet based, while others require larger, more specialized programs or systems, but still illustrate the success of prototype and production models.

Fifteen years after the introduction of the PC, we have moved over to a spreadsheet platform that is much friendlier than the line-by-line, mainframe style of input and output and the spreadsheet communicates better to a wider audience. With the solver add-in by Frontline Systems now standard for Excel, Quattro and Lotus, there is a quick and simple way to get the results of management science models and then make tables, graphs and charts to show the analysis of the results.

Now there are almost a dozen textbooks using this spreadsheet approach, in the hope that the tide can be turned, the dike shored up, and a new positive direction can be achieved for management science. Being able to teach MS/OR using this approach has taken out the drudgery for both teacher and student, and brought back the fun, practical application, and emphasis on analysis, communicating the results both in verbal and written reports.

The Final Hurdle

There are two final hurdles, in my opinion, to getting management science modeling

and analysis back into the mainstream of business schools. First, is the education of the professors to use this technique and to learn to emphasize the modeling of problems and analysis of results. Second, for the AACSB to recognize that MS/OR modeling and analysis is a valuable managerial tool, separate from POM. In this way we might proceed from being "dumb and dumber" to "working smarter, not harder." ■

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where senior faculty members mentor junior faculty members and let them get most of the credit for the teamwork. On the other hand, all three assessment approaches used inflate the research productivity of some senior professors widely known as authorship hounds, demanding from junior faculty or students that their names be included, and/or be placed first, in articles which, in many cases, they have not contributed to.

Last, defining research productive by counting the article's number of pages seems extremely bureaucratic and totally unrelated to the quality of the article or its contribution to the literature. Perhaps more important considerations are estimated number of readers and average number of citations per subsequent articles published on the same topic. ■

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