



CHALLENGE

To assess the fairness of hazard insurance rates and medical insurance claim payments.

SOLUTION

Use JMP® to analyze large data sets for evidence to support or dispute rates and claims.

RESULTS

The University of Central Florida teaches students how to perform exploratory data analysis and data mining, and one of its professors uses those skills to advise the Florida Insurance Commission.

MORE INFORMATION

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From Classroom to Courtroom

A University of Central Florida professor makes JMP® software a constant companion—for teaching, examining the effects of hurricanes and as an expert witness for the State of Florida

A convincing argument could be made that Mark Johnson is the consummate JMP user. JMP is, for Dr. Johnson, both a pedagogic and a practical tool – and it is indispensable in both regards.

Johnson is a professor in the University of Central Florida (UCF) Department of Statistics and Actuarial Science. But he's certainly not a man who confines himself to the classroom. In addition to being well published, Johnson has served on the Florida Commission on Hurricane Loss Projection Methodology and is regularly an expert witness for the State of Florida in assessing health-care claim overpayments.

In each of these capacities, JMP statistical discovery software from SAS is at hand.

Offering students an edge

Johnson has been using SAS® software since he was a graduate student at the University of Iowa in the '70s, so it's no surprise that he's incorporated this software into his teaching. He was first introduced to JMP in 1999 while conducting Six Sigma Black Belt courses to Motorola employees.

"I began exploring JMP, and it was a lot of fun," Johnson says. "So, I mastered it in a teaching environment, and once you've used it there, you tend to use it everywhere."

Johnson recalls working with Excel as well, but now says, "Forget that. You can do everything in JMP that I would have ever dreamed of doing in Excel. It's just effortless. I use it every day."

He uses it, for example, in UCF's Data Mining Certificate program, the first of its kind in the country and with which SAS is a collaborator. The program offers a master's degree in data mining with advanced curricula in the exploration and analysis of large quantities of data to uncover meaningful patterns and models. Students' primary tools in the program are SAS Enterprise Miner™ and JMP.



**STATISTICAL
DISCOVERY.™
FROM SAS.**

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Professor Mark Johnson
Department of Statistics and Actuarial Science
University of Central Florida

“We use both SAS Enterprise Miner and JMP in a variety of courses,” Johnson says. “And when students graduate, they get good jobs at good companies because they’re familiar with the leading software packages for data mining and visualization.

“That definitely gives students an edge in the job market.”

Johnson also uses JMP in less advanced classes. He says he finds it quite useful in the initial analysis and examination of large data sets, using the JMP Distribution platform.

“Column by column, it gives a very quick summary, and almost invariably, when you look at a data set for the first time, you’ll notice some irregularity or missing data. It’s very good experience for students to realize that you’ve got to be on your toes to find problems or they’ll come back and haunt you.”

As a teaching tool, Johnson also likes that JMP has a number of features that assist both in looking simultaneously at variables in order to pick up outliers and in providing a view into the structure of the data for making initial predictions.

Perilous endeavors

Outside the classroom, Johnson encounters peril—more accurately, *perils*, plural—as in, all manner of disasters, with a focus on natural ones. He deals with hurricanes, for example—with which Florida is, of course, quite familiar.

Insurance rate filings are a big concern in Florida. In order to provide a mortgage, banks require proof of insurance against hurricanes. Premiums on that insurance must be set at a rate that works for both the insured and the insurer. A lot of insurance companies, Johnson says, abandoned Florida, or tried to drop clients, after a particularly rough 2004–05 hurricane season. Setting rates is tricky business. Those rates must be appropriately based on the historical record.

“It’s pretty complicated,” Johnson says. “The rates are tied to the frequency of storms, the intensity of storms, and whether things are changing over time. You want the companies who are setting rates to do an honest assessment. As a consumer, you want low rates, but you also want rates that allow the companies to be solvent, so if there is indeed an event, they will be able to pay all their claims.”

Companies commonly known as ‘modeling companies’ are expected to come up with estimated losses associated with a portfolio of properties. Are they doing that correctly?

Johnson is there with JMP to assist.

“You can’t beat running distributions in JMP. Whether it’s categorical or continuous data, the first thing I do when anybody gives me any kind of data is load it into JMP, column by column, to analyze distribution, and that gives me a quick idea of what that data is like. Also, I can tally things easily. I use table summaries all the time to help catch double counts, which are painful things to uncover, and I just find things a lot faster.”

Essentially, it’s a matter of determining if the insurance companies have done their homework. The companies will present their own data to the commission for approval. Johnson will immediately receive that data. He can then very quickly and efficiently run it through an analysis with JMP and make an authoritative assessment.

“When I run my calculations with JMP, I’m in a very strong position to tell the commission I think the company is fine, or to say to the company, ‘Hey, you’ve got some explaining to do.’”

“In an audit process where there are lots of data sets and I need to quickly assess which ones are good candidates for grilling the company about and which ones are giving me assurance that I don’t need to go there, JMP is the tool.”

Johnson and UCF also work with Watson Technical Consulting and the Kinetic Analysis Corporation in investigating hurricane damage prediction and mitigation. These consultancies develop hazard maps to support

local mitigation strategies for the State of Florida, for example, and work with the Organization of American States to develop hazard data for the Caribbean.

Unassailable

For Johnson, there's also work to be done as an expert witness for the State of Florida, which calls upon him to analyze healthcare claim payments when the state is reimbursing doctors for Medicare and Medicaid claims. Occasionally, a doctor or a clinic will be overpaid.

Johnson's role is to help expose the cases that are most egregious. An audit will be conducted in which a subset of the claims will be examined. His job is to audit the state's own audit—to substantiate or correct the state's numbers by running them through analyses with JMP.

"Then, with my JMP analyses at hand when I testify," Johnson says, "I'm confident that the numbers I'm giving are unassailable in court."

"I do my calculations with JMP, and it's the end of story. I don't expect to be surprised with the comment in court, 'Well, we see a problem.' That just doesn't happen."

Up and running

Mark Johnson is quite clearly a very busy man—one who on an almost daily basis turns to the data analysis

capabilities of JMP—a man who takes considerable advantage of JMP software's extensive arsenal of tools.

Johnson knows the value of statistics and finds them in JMP. On an almost daily basis he turns to the JMP Fit Y by X and Fit Model platforms, and more. He uses multivariate methods for higher-dimensional data and JMP neural nets for data mining problems. Recursive partitioning, he says, is quite handy for introducing students to decision trees.

"As teaching tools, JMP's recursive partitioning and neural net capabilities are as easy as I've seen," Johnson says. "The Fit Model platform in JMP is terrific, and I use the JMP Custom Designer whenever I have to design an experiment. That one is super. I recommend it to everyone."

He also finds JMP graphics, which are automatically generated with most analyses, to be a great tool in presenting his data. "The visualizations are really very crisp and clear."

Johnson tells of teaching a course called Competing Analytics in the Professional MBA program. He introduced one group of students to JMP and, after one short evening session, "They were up and running analyses, no problem."

Like teacher, like student.



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