CHALLENGE

Teaching business statistics to a diverse population of future business leaders.

SOLUTION

Use JMP® software to learn and apply basic and advanced data analysis skills to complex, real-world business problems.

RESULTS

Wharton MBAs graduate with the analytics and software skills that help them succeed in the businesses where they will play a leading role.

MORE INFORMATION

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STATISTICAL DISCOVERY.™ FROM SAS.

Wharton Gets Down to Business

JMP® helps arm Wharton MBA students with analysis skills that will pave the way to successful careers

Students who enroll in Robert Stine's MBA statistics courses at Wharton, the business school at the University of Pennsylvania, arrive with widely diverse backgrounds and varied degrees of experience with statistics.

"Our MBA students come in with a remarkable range of backgrounds," says Stine. "We may have a music major and a PhD in physics in the same classroom, going through the program at the same pace. It's our job to bring them to a point where they have similar skills for doing data analysis."

Though their life histories are very diverse, each of these students has spent untold hours in the company of a critical, common associate: the computer.

Computer skills level the playing field and help Stine provide his students with the understanding of statistics they'll require to excel in the business world. JMP statistical discovery software from SAS is the tool that helps him build that understanding.

"JMP is a statistical tool that takes advantage of computing in a really powerful way," Stine says. "Unlike the other tools that are out there – which are basically the same as they were 20 years ago, just faster – JMP does things that other software doesn't do."

Specifically, what most impresses Stine about JMP is the scope of its tools and their interactive nature.

"JMP has the analytics that we need," Stine says. "JMP is very impressive to see in action – and I do mean in action – because JMP is so interactive and graphical. The range of graphics used to convey statistical results is superb.

"JMP is so intuitive, and it runs really fast on large data sets."

The business of business

Robert Stine isn't averse, if need be, to designing his own software. Or at least he didn't used to be. But, he says that when he first saw JMP, he thought, "There's no need for me to write another statistical package because with JMP, SAS has done it all. What else do I need?"

In Stine's view, full access to the latest version of JMP, which is enhanced every 18 months or two years, is an invaluable asset for his students.

" Think of it as a customized tool for interacting with the data, rather than just as producing something you're going to print on a piece of paper. Once business students start thinking about the graphics as analytic tools, JMP becomes an enormously powerful asset for them."

Robert A. Stine, Professor of Statistics
The Wharton School of the University of Pennsylvania

Once back out in the real world, armed with MBAs from the first US business school and one of the nation's most prestigious programs, these former students will be called upon to run the world's businesses.

Some will play key roles in large retail chains, where they have to determine how inventory is monitored; whether it is okay to sample date; or whether the problem requires more comprehensive counts. Others will take the lead role in analyzing international financial markets – where to invest, how to adjust for differences in financial markets in different countries. Yet others may design marketing campaigns in a wide range of known and soon-to-be invented industries, determining which customers should be targeted for special promotions, or which are most likely to be receptive to an offer to upgrade their services.

As such, Stine says, "We use fairly large data sets in our classes, similar in size to the global-sized data sets they're going to see when they get out there in the business world. It's not uncommon for students to work with a couple of thousand rows and 30 or 40 columns of data.

"It's nice to be able to analyze that kind of data with a tool that's as capable as JMP."

Making it real

Typically, Stine uses simulations of real-world data where students or student teams work with the same scenario, but each is given a different set of data. That way, Stine explains, students can have a shared experience, and they can discuss the modeling task in class, but they may be working with very different relationships among the data.

"In one model, income might be an important predictor," says Stine, "whereas in another person's model, education is the important predictor. So students can share the decisions they have to make and talk about how they have to go about it, but the models they end up with are individual."

Stine has a rotating portfolio of applications that he provides to his classes. One is a manufacturing application in which students estimate a firm's cost of meeting an order for a customized part.

Another is a real estate application where students are tasked to identify an ideal site on which to locate a new business, considering the advantages and disadvantages of one site relative to another.

A new, timely application looks at subprime mortgages and estimating credit risks.

"We rotate these from year to year," says Stine, "just to keep it novel."

Stine says that similar problems arise in each of these applications. "They're all regression-type applications. Students typically will be working with data sets with 300, 400 or perhaps up to a couple of thousand observations. The data sets may have 30 or 40 columns of possible predictive information. The data may be messy, like they might find when they leave the halls of Wharton after graduation, or at jobs where they currently may be employed. It may require cleanup.

"So, we very much exploit the diagnostic capabilities that are built into JMP," says Stine. "The ability to easily manipulate data is critical. JMP gives us that.

"The graphical displays are very, very important to us. We always hide a few outliers and strange curvatures and such in these examples, and you can't just routinely use something like stepwise regression and expect that you're going to find the right model. You have to really look at things, you have to think about things, and you have to be able to interpret the model that comes out.

"We use JMP extensively for all that. It provides the right kind of feedback. It basically forces students to look at pictures, and we think that's so important to having a good model."

Exotic, too

Stine reserves some of JMP's features for his more advanced, "exotic" classes. For example, Stine really enjoys teaching classification trees with JMP because he feels that most other software is too esoteric, and has hard-to-decipher options that students just won't delve into. On the other hand, he says, "The JMP presentation of a classification tree is so easy and natural to follow that students immediately grasp what the idea is, and you don't have to spend time on things that in the end aren't important for these students to understand.

"I can talk much more about the interpretation of the results rather than wasting time on programming – how you have to type this command next, and it has to be lowercase instead of uppercase, and you have to type in this funny number over here. With JMP, we just don't have to deal with those kinds of programming issues."

Moreover, the fact that it's all integrated into a tool with which they've become familiar in their basic regression classes, and can now use for these more advanced analyses is, Stine says, "a nice combination."

Good stuff happens

Stine says he and his students find JMP's pop-up "help" messages to be very useful, and they also appreciate the fact that all the documentation is available online.

But, he says, it ultimately comes back to the comprehensiveness of the JMP capabilities and their interactive nature.

Stine says that he's begun telling students who ask how to do something in JMP to "just click on things, stuff happens – and then you'll figure out how it needs to be done.

"It's just such a powerful piece of software; you're always intrigued that there's probably yet another way to do what you're doing – and probably just as good as your current way."

Stine tells students that when working with a graphical tool in JMP they should think about it as a way of truly *interacting* with data.

"I say, 'Think of it as a customized tool for interacting with the data, rather than just as producing something you're going to print on a piece of paper.' Once business students start thinking about the graphics as analytic tools, JMP becomes an enormously powerful asset for them.

"There are all kinds of little things that this software does to change the way you think about interacting with data," says Stine. "And at the end of the day, that's one of the big jobs we are sending our graduates out into the world to do."

VISUALIZING MILLIONS

Robert Stine uses JMP in his own research as well.

He and a colleague built a model for predicting financial risk. Their task was to try to anticipate bankruptcy, and they had a data set consisting of approximately 3 million observations.

"We developed our own software to build this model," Stine explains, "and at some point early on in the development of that model, things weren't working well."

So – in recognition of its strong graphical capabilities – they looked at the data using JMP. When they could see the pictures associated with the data, they were able to understand how to improve their modeling technique.

"What was very impressive to us," Stine recalls, "was that we could build a logistic regression with that many observations and have it work out. That was pretty nice; because otherwise, it's very hard to visualize large data sets. JMP's capability in that regard was really nice."

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