



Statistical Discovery.™ From SAS.

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## A new generation of statistics-literate educators

Empowering future educators with statistics savvy

The Shibaura Institute of Technology (SIT) first installed JMP® Pro in 2014 with the signing of a special licensing agreement that would allow all faculty members and students unlimited access to the statistical discovery software. Although JMP Pro has a wide range of capabilities spanning diverse application areas, its use in teacher training is unique. Since adopting JMP Pro for its classrooms, SIT has organized intensive summer courses for future teachers who will one day teach statistics at junior and senior high schools across Japan. Approximately 80 students and faculty members have participated.

### SIT takes a hands-on approach to teaching statistics

Associate Professor Hideyo Makishita of SIT's College of Engineering is making the rounds in his classroom. Taking a stack of origami paper from a large bag on his desk, Makishita distributes one sheet to each student. "You must fold the paper only twice to find a spot that divides the side equally by three," he says, referencing Haga's theorems of geometry. Circulating again to dispense pens, Makishita suggests adding dots to demarcate the paper's divisions. When isosceles triangles appear in the corners of the paper surrounded by the broken and folded lines of an Egyptian triangle (a right triangle wherein the ratio of the three sides is 3:4:5), the point generated by the two triangles is

that which divides the side into three equal parts.

"I always tell my students that it is natural for teachers to be able to solve problems, but we need to nurture teachers who also have the ability to inspire students to pursue statistics and math further," says Makishita. Using origami is just one small example of a hands-on approach to statistics.

Makishita, a longtime junior high and senior high school mathematics teacher at the University of Tsukuba, currently focuses on pedagogical methods. Among his interests are teaching practice and guidance, practical training, education theory, probability theory and statistics. He currently teaches at the SIT College of Systems Engineering and Science and the College of Engineering and Design, where his students pursue teaching certificates.

For Makishita, problem solving is a crucial part of any teacher training course. And what better way to think logically about problem solving than with statistics? In fact, the government of Japan has recently made a move to promote statistics education starting as early as junior high school. A member of the editorial committee for high school mathematics textbooks authorized by Japan's Ministry of Education, Makishita understands the need to

### CHALLENGE

To find new and innovative ways to introduce the next generation of teachers to statistical analysis.

### SOLUTION

Shibaura Institute of Technology (SIT) encouraged all students and faculty to expand their understanding of statistics using easy-to-learn JMP® Pro statistical discovery software.

### RESULTS

Students and faculty members across SIT adopted JMP Pro to augment their use of statistical analysis in everything from basic coursework to graduate research. With the help of JMP Pro, SIT made statistics education both accessible and enjoyable for future educators.

provide the next generation of educators with the most current information.

"Students learn to adopt a statistical way of thinking in the first year of junior high school in a course called Utilization of Materials," he says. "Once they reach high school, students learn the basics of descriptive statistics and data analysis, including correlative coefficients and statistical estimation. Since future mathematics teachers will be teaching statistics content, I want students in teacher training courses to have the opportunity to learn statistics themselves." That's where JMP Pro comes in.

"I am reminded of the age-old Japanese expression *senmitsu*. Statistics surround us, though we may not see it. Using JMP Pro, that veneer of imperceptibility melts away and statistics begins to feel more familiar."

Hideyo Makishita  
Associate Professor

### Accelerated learning with JMP® Pro

At SIT, JMP Pro has become an invaluable tool for teaching statistics to future teachers. The intuitive, visual nature of JMP Pro makes it not only easy to learn, but easy to master. For this reason, Makishita sought to make JMP Pro the universitywide standard for statistics and mathematics courses at SIT. To demonstrate how this software could be used on a wide scale, Makishita held a special lecture about how the unique capabilities of JMP Pro were especially well-suited for teaching methods classes.

This lecture, which stemmed from a collaboration between Makishita and local JMP engineers, was later offered at the Toyosu and Omiya campuses of SIT as an intensive summer course for students and faculty members alike. At SIT, students have access to JMP Pro throughout their time on campus – so they really get a feel for how this software assists in the learning process.

"It was my intention that this course provide an opportunity for students to learn what JMP Pro can do. And it's something that they can offer to their students when they themselves become teachers in the future," says Makishita.

With SIT's JMP Academic Suite, JMP Pro is available for both Windows and Macintosh and can be installed on

students' personal computers simply by accessing the university's website. This kind of unlimited access enables students and faculty to use JMP Pro outside of the classroom, whether for advanced quantitative research or basic coursework exercises.

In his lectures, Makishita emphasizes the expressive power of the graphs drawn in JMP Pro, a feature that he himself has found useful in his research and scholarship on pedagogical theory and practice. Data visualization through features like the JMP Pro Graph Builder may be designed to augment exploratory data analysis, but Makishita has found that JMP Pro also serves another purpose: getting students excited about the world of statistics.

### Statistics surrounds us

"Though each and every one of us uses statistics on a daily basis," says Makishita, "I think many people believe that they are not good at the subject. In statistics, about 99.7 percent of data is distributed within the average  $\pm 3$  sigma in a normal distribution. Only about 0.3 percent of the data is out of range.

"I am reminded of the age-old Japanese expression *senmitsu*," says Makishita. "Statistics surround us, though we may not see it. Using JMP Pro, that veneer of imperceptibility melts away and statistics begins to feel more familiar."

Makishita's summer course is not just a one-time event. New students enroll at SIT every year. By continuing to offer this course, Makishita aims to reach as many future teachers as he can. Statistics can help us unlock new knowledge and see our world in different ways. "When my students become teachers themselves one day," Makishita says, "JMP will help them to pass on this knowledge to the next generation of students."

### About Shibaura Institute of Technology



Established in  
1927  
Approximately  
8,500 students  
(as of 2015)

[shibaura-it.ac.jp](http://shibaura-it.ac.jp)

Throughout its 88-year history, the Shibaura Institute of Technology has remained dedicated to social progress and committed to its foundational philosophy, "nurturing engineers who learn from society and contribute to the wider community."

SIT continues to respond to the challenges of an increasingly globalized society, producing skilled engineers with the high ethical standards and practical knowledge to further technological advancement and innovation both across Japan and the world.



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