Keeping Students On Track

American Public University System turns to predictive analytics to boost student retention and academic excellence

American Public University System
AMU · APU

Overview

The Need
A leading online university sought to boost student retention and academic excellence by identifying the factors driving student behavior and predicting the likelihood of an individual student staying on course or dropping out.

The Solution
APUS deployed IBM® SPSS® Modeler to identify the variables crucial to student retention and provided administrators with online dashboards to identify at-risk students and build intervention strategies, including better course designs, to keep students on track to graduation.

What Makes it Smarter
Data-driven analysis of student behavior and course surveys gave university administrators a solid basis for understanding student retention, improving intervention strategies designed to keep students in school.

The Result
The university can now predict with approximately 80 percent certainty whether a given student is going to drop out.

What makes a college student stay in school? Over the years, educators have held a lot of theories – from student demographics to attendance in college prep courses – but they've lacked the hard data to prove conclusively what really drives retention. As a result, colleges and universities have struggled to understand how to lower drop-out rates and keep students on track all the way to graduation.

That situation is changing at American Public University System (APUS), an online university serving 70,000 distance learners from the U.S. and more than 100 countries. APUS is breaking new ground by using IBM SPSS predictive analytics to zero in on those factors that most influence a student's decision to stay in school.

"By leveraging the power of predictive analytics, we can predict the probability that any given student will drop out," says Phil Ice, APUS' director of course design, research and development. "This translates into actionable business intelligence that we can deploy across the enterprise to create and maintain the conditions for maximum student retention."

Rich data sources
As an online university, APUS has a rich store of student information available for analysis. "All of the activities are technology-mediated here," says Ice, "so we have a very nice record of what goes on with the student. We can pull demographic data, registration data, course level data, and more." Ice and his colleagues then develop metrics that help APUS analyze and build predictive models of student retention.

One of the measures, for example, looks at the last time a student logged into the online system after starting a class. If too many days have passed, it may be a sign the student is about to drop out. Educators at APUS combine such online activity data with a sophisticated end-of-course survey to build a complete model of student satisfaction and retention.

Business Benefits

- Helped the university identify the key variables driving student retention

- Leveraged course surveys to analyze the student learning experience according to key social, teaching, and cognitive factors

- Provided administrators with easy-to-use decision-making tools to support the retention process.

- Protected the university's bottom line by establishing the conditions for improved revenue flow

The course survey yields particularly valuable data for APUS. Designed around a theoretical framework known as the Community of Inquiry, the survey seeks to understand the student's learning experience by analyzing three interdependent elements: social, cognitive, and teaching presence. Through the survey, Ice says, "we hone in on things such as a student's perception of being able to build effective community."

Increasing accuracy

It turns out that the student's sense of being part of a larger community – his or her "social presence" – is one of the key variables affecting the student's likelihood of staying in school. Another one is the student's perception of the effectiveness of online learning. In fact, when fed into IBM SPSS Modeler and measured against disenrolment rates, these two factors together accounted for nearly 25 percent of the overall statistical variance, meaning they are strong predictors of student attrition.

"For the first time, we have a statistical model that can show, based upon data, which students are most susceptible to attrition," Ice says. "Before we started using IBM SPSS predictive analytics, we were just guessing from among hundreds of variables and trying to put them together by hand. Modeler made connections that were not apparent to us on the surface, but proved to be extremely accurate." Indeed, since enlisting the help of IBM SPSS Modeler in its retention efforts, APUS can now predict with approximately 80 percent certainty whether a given student is going to drop out.

Some of the findings generated by its predictive models actually came as a surprise to APUS. For example, it had long been assumed that gender and ethnicity were good predictors of attrition, but the models proved otherwise. Educators also assumed that a preparatory course called "College 100: Foundations of Online Learning" was a major driver of

Smarter Higher Education: Data mining helps online university tackle retention challenge

	Instrumented	Data from student registration, online coursework, and surveys are integrated into predictive models.
	Interconnected	Actionable intelligence from data mining is communicated via dashboards to administrators and faculty around the university.
	Intelligent	Replacing guesswork about student retention with statistical models gives the university a sound basis for accurate decision-making and yields more effective intervention strategies.

Solution Components

Software
- IBM SPSS Modeler

- IBM® SPSS® Decision Management

- IBM® SPSS® Text Analytics
  for Surveys

Services
- IBM® SPSS® Worldwide Services

"*Attracting and enrolling
new students is expensive,
so losing them is costly
for us and for students
as well. That is why we
are excited about using
predictive analytics to
keep retention rates
as high as possible.*"

Dr. Frank McCluskey, provost and
executive vice-president, APUS

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retention, but an in-depth analysis using Modeler came to a different conclusion. "When we ran the numbers, we found that students who took it were not retained the way we thought they were," says Dr. Frank McCluskey, provost and executive vice-president at APUS. "IBM SPSS predictive analytics told us that our guess had been wrong."

Strategic course adjustments

The next step for APUS is to put its new found predictive intelligence to work. Already the university is building online "dashboards" that are putting predictive analytics into the hands of deans and other administrators who can design and implement strategies for boosting retention. Specific action plans could include targeting individual at-risk students with special communications and counseling. Analysis of course surveys can also help APUS adjust course content to better engage students, and provide feedback to instructors to help improve their teaching methods.

Survey and modeling results are reinforcing the university's commitment to enriching the student's sense of community – a key retention factor. Online courses, for example, are being refined to promote more interactions among students, and social media and online collaboration tools are being deployed to boost school spirit. "We have an online student lounge, online student clubs, online student advisors," says McCluskey. "We want to duplicate a campus fully and completely, where students can grow in all sorts of ways, learn things, exchange ideas – maybe even books – and get to know each other."

Smart decisions

While predictive modeling gives APUS an accurate picture of the forces driving student attrition, tackling the problem means deciding among an array of possible intervention strategies. To help administrators sort out the options, APUS plans to implement IBM SPSS Decision Management, a solution that turns Modeler's predictive power into intelligent, data-driven decisions. The solution will draw from Modeler's analysis of at-risk students and suggest the best intervention strategies for any given budget.

APUS also plans to delve deeper into the surveys by mining the open-ended text responses that are part of each questionnaire (IBM SPSS Text Analytics for Surveys will help with that initiative). All of these data-driven initiatives aim to increase student learning, enhance the student's experience, and build an environment that encourages retention at APUS. It's no coincidence that achieving that goal also helps grow the university's bottom line. "Attracting and enrolling new students is expensive, so losing them is costly for us and for students as well," McCluskey says. "That is why we are excited about using predictive analytics to keep retention rates as high as possible."

About IBM Business Analytics

IBM Business Analytics software delivers complete, consistent and accurate information that decision-makers trust to improve business performance. A comprehensive portfolio of business intelligence, predictive analytics, financial performance and strategy management, and analytic applications provides clear, immediate and actionable insights into current performance and the ability to predict future outcomes. Combined with rich industry solutions, proven practices and professional services, organizations of every size can drive the highest productivity, confidently automate decisions and deliver better results.

As part of this portfolio, IBM SPSS Predictive Analytics software helps organizations predict future events and proactively act upon that insight to drive better business outcomes. Commercial, government and academic customers worldwide rely on IBM SPSS technology as a competitive advantage in attracting, retaining and growing customers, while reducing fraud and mitigating risk. By incorporating IBM SPSS software into their daily operations, organizations become predictive enterprises – able to direct and automate decisions to meet business goals and achieve measurable competitive advantage. For further information or to reach a representative visit www.ibm.com/spss.

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