



Using Data to Boost Student Engagement and Retention

When American Public University System (APUS) needed a better way to foster retention and success among their more than 100,000 global distance learners, they turned to IBM. See how APUS is using IBM SPSS predictive analytics for Student Retention to not only identify students who are at-risk of dropping out, but also to help keep those students on track for graduation.

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The Challenge

APUS is a for-profit, online learning institution based in West Virginia, serving more than 100,000 distance learners in the United States and abroad. Originally founded in 1991 as American Military University (AMU), the institution was designed to serve the specialized educational needs of military personnel. In 2002, AMU became American Public University System and opened a new institution, American Public University (APU), aimed at adult learners interested in public service programs. APUS offers 87 degree programs and 68 certificates through both universities.

Like other online institutions, APUS struggled to retain students. Facing a dropout rate 5-17 times greater than face-to-face programs, the university needed a way to reduce turnover and cut the direct and indirect costs of losing students, says Phil Ice, APUS vice-president of research and development.

"In addition to the lost tuition, it's much more beneficial for ROI to retain a student than to recruit a student," says Ice. "And the human capital cost is significant. We're always looking to increase cost-effectiveness so that we can direct more funds toward improving the educational experience and giving every student the opportunity to succeed."

But the effort to conduct analysis at APUS was producing an unmanageable surfeit of information. "We were inundated with data, so it was challenging to try to make sense of it for deans and others," says Ice. "We saw that we needed to improve the workflow, aggregate data, and create more transparent deliverables." Ice and his team did their due diligence in looking at different solutions. "I'd dealt with several different student retention solutions in the past and found that IBM was the most user-friendly and easiest to deploy," says Ice.

Predictive Modeling

In late 2008, APUS implemented IBM SPSS Modeler, a diagnostic solution that allows administrators to identify and predict at-risk students. Powerful predictive models combine with business logic and an intuitive user interface to develop predictive insights into all the factors that affect retention and graduation rates—including learning problems, financial challenges, and difficulty fitting in. According to Dave Becher, APUS associate vice president of institutional research, APUS initially worked with a consultant to build a predictive model for both undergraduate and graduate retention, using persistence data—including log-in frequency, time online, number of course completions, and grade point average—and IBM SPSS Modeler.

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 each student. We can pull demographic data, registration data, course level data, and more." IBM SPSS Modeler enabled Ice and his colleagues to develop metrics that helped 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.

Student survey responses are a particularly important source of data at APUS. Designed around a theoretical framework known as the Community of Inquiry, the end-of-course 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."

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 is the student's perception of the effectiveness of online learning. When fed into IBM SPSS Modeler and measured against disenrollment rates, these two factors together accounted for nearly 25 percent of the overall statistical variance at APUS, meaning they are strong predictors of student attrition.



Solution Components

- IBM® SPSS® Modeler
- IBM® SPSS® Statistics
- IBM® SPSS® Text Analytics for Surveys

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—Phil Ice, director of course design, research and development, APUS



“For the first time, we now have a statistical model that can show, based upon data, which students are most susceptible to attrition,” Ice says. “Before we started using IBM 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. We can now predict with approximately 80 percent certainty whether a given student is going to drop out.”

Some of the findings generated by the 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. Faculty and administrators had also assumed that a preparatory course called “College 100: Foundations of Online Learning” was a major driver of retention, but an in-depth analysis using IBM SPSS 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, former provost and executive vice-president at APUS. “IBM SPSS predictive analytics told us that our guess had been wrong.”

Intervention Strategies

Once APUS had an accurate picture of the forces driving student attrition, they used Modeler’s analysis to provide intervention recommendations—for any given budget—that would keep students on track for graduation. Reports culling all available student data—financial aid assessments, academic performance, demographic information, attendance records, and survey responses—enable Ice and his team to identify potential at-risk students early and create personalized action plans designed to keep these students in school.

“My team creates raw actionable intelligence that we pass on,” says Ice. “Modeler first helps us gain clarity on student issues. For example, irregular activity can be a warning sign. We relay that information to the student’s advisor, who can tailor the information to the student and achieve a high degree of efficacy.”

After the IBM SPSS model identifies students likely to drop out, APUS places calls to higher-risk students and sends e-mails or instant messages to lower-risk students, with different outreach methods still under review. Action plans often include counseling as well. “We’re collecting data on different intervention techniques to see what works best,” says Becher.

Survey and modeling results are also reinforcing the university’s commitment to enriching the student’s sense of community—a key retention factor. APUS is refining online courses to promote more interaction among students, and deploying social media and online collaboration tools 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.”

Refining Instructional Design

IBM SPSS predictive analytics is also turning results from end-of-course surveys into actionable data that can be used to inform instructional design and best practices. “When we talk about intervention, it’s not always a student-level intervention. It’s often around faculty, and this type of intervention has been going on at APUS for two years,” says Ice.

The end-of-course survey asks students to comment on the ongoing feedback they receive from instructors. “We’re finding that students are very feedback-oriented and they look for very directed feedback,” says Ice. Their analysis has also found that the depth and value of learning activities are extremely important to students. “We’ve found this is universally true across our student population, no matter which year students are in or which courses they’re taking,” says Ice.

APUS is now routinely transferring the survey data to the Center for Teaching and Learning, to help faculty refine their teaching practice on an ongoing basis. The university now plans to delve deeper into the end-of-course surveys by mining the open-ended text responses that are part of each questionnaire, using another student-retention solution component, IBM SPSS Text Analytics for Surveys.

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—Phil Ice, director of course design, research and development, APUS

Course Level Impact

APUS is also using the data to make changes that will boost student engagement. Course level data from the university's learning management system combined with analysis of end-of-course survey responses enables APUS to see where they can adjust course content to better engage students.

"We've had a lot of interest from different departments to see how this might work and how they could participate," says Becher, who is meeting with the vice president of student services to analyze course level data to help students stay in specific courses. The university has also formed a Student Success and Retention Committee. "I work with the committee to give them the data, and we're in the process of moving from a reactive to a proactive mode now that we have the people, the analysis, and the resources in place," says Becher.

Collaboration with other Institutions

APUS continues to build on its data sources, externalizing data and comparing with other institutions. The university is participating in the Predictive Analytics Reporting (PAR) Framework, a longitudinal data-mining project in which six postsecondary institutions are pooling data and analyzing retention issues.

The PAR Framework project is managed by WCET, the WICHE Cooperative for Educational Technologies, and includes the Colorado Community College System, Rio Salado College, the University of Hawaii System, the University of Illinois Springfield, and the University of Phoenix, in addition to APUS. The group has already begun to share its findings, beginning with early results presented at the October 2011 WCET Annual Conference in Denver, CO.

"We're starting to see some meaningful trends," says Ice. For example, one initial finding suggests that, for at-risk students, a higher number of concurrent courses may be associated with disenrollment. Although many educators believe that immersing students in the college experience and promoting continuous academic activity are keys to long-term success, the PAR early findings suggest that, for at-risk students, immersion in the form of concurrent courses may be counterproductive. The problem may be compounded for at-risk students who depend on financial aid, because financial aid eligibility typically requires students take 12 credit hours in a semester.

Impact

APUS has replaced guesswork about student retention with statistical models that provide a sound basis for accurate decision-making and yield more effective intervention strategies. Longitudinal studies of some at-risk student groups have found that they are now less at risk. For example, C students have shown a decreased level of attrition in a four-year longitudinal sample. "We're seeing a definite positive correlation between the provisioning of intelligence and improved retention and progression," says Ice.

Overall, IBM SPSS predictive analytics delivers consistent, accurate information every time and protects the university's bottom line by establishing the conditions for improved revenue flow. "Attracting and enrolling new students is expensive, so losing them is costly for us and for students as well. That's why we're excited about using predictive analytics to keep retention rates as high as possible," says McCluskey.



CAMPUS TECHNOLOGY

9201 Oakdale Ave.
Suite 101
Chatsworth, CA 91311
(818) 814-5277



IBM Corporation
1 New Orchard Road
Armonk, New York 10504-1722
United States
(914) 499-1900

About Us

About Campus Technology

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