University of Western Sydney learns the secrets of student retention

Harnessing predictive analytics to understand and address the key causes of student attrition

University of Western Sydney

Smart is...

Predicting when students are likely to drop out and giving them the right help at the right time

The University of Western Sydney (UWS) wants to ensure that as many of its students as possible reach graduation – helping them achieving their academic goals, and protecting its own finances. Student attrition is one of the biggest threats to this objective.

To reduce the risk of attrition, UWS is using analytics to predict when a student is likely to leave, assess the cause, and trigger appropriate interventions to encourage them to stay.

Imagine you are a student at university. You suddenly run into financial or family problems, you are not sure if the course is right for you, or perhaps you just feel like you are not succeeding academically. You wonder whether it might be better to move to another university, or even drop out.

In many cases, universities have resources in place to help their students deal with all of these issues – the problem is, many of the most vulnerable students don't ask for help. In many cases, the university only finds out that a student is struggling or an intervention is required when they have already left.

A related problem is when students decide to move on to other universities after completing their first year. Universities need to identify these students and take corrective action to ensure that the investment they make in helping the students succeed is not lost to other universities.

Neil Durrant, Director of Performance & Quality at the University of Western Sydney, explains: "Student retention is an issue across the higher education sector. At UWS, we have more experience than most because we have such a strong focus on supporting students from non-traditional academic backgrounds, where attrition rates can be higher for various cohorts.

"You can't wait for students to come to you with their problems, you have to be proactive and look for the warning signs – and a lot of universities are investing in predictive analytics to try and do just that. But at UWS, we realized that simply assessing the risk of a student leaving the university isn't enough: in order to help them, you also need to understand their motivation for leaving."

IBM

Business benefits

- New insight into the factors behind student attrition enables UWS to design more effective retention strategies.
- UWS is creating an end-to-end service where data is automatically collected, analyzed, and used to recommend the best course of action.
- Reducing attrition rates could deliver millions of dollars in benefits by protecting the university from the loss of income when students leave.

The need of the hour was to assign a risk profile to each student, which could be used to identify those who were likely to drop out of the system altogether, and those who were likely to move on to another university at the end of their first year. This would help UWS take appropriate actions to support students in ways that are relevant to their particular risk factors.

Turning vision into reality

Several years previously, UWS had purchased a suite of IBM® SPSS® solutions from the IBM Watson™ Foundations portfolio. "At the time, we were working on a data collection project, but our vision for the future involved using the predictive analytics capabilities of SPSS too," says Neil Durrant. "Student retention is an area where this investment can really pay off."

UWS began by using IBM SPSS Modeler to analyze the historical data it held on student demographics, academic results, and attrition. This analysis not only identified the key variables that correlate with attrition, but also suggested that there were several different types of attrition, driven by different motivations.

What drives attrition?

The team was able to define three broad categories: students who leave because they aren't academically prepared for university, students who leave because of personal issues such as family or financial problems, and students who leave because they want to enroll at a different university. This last group are known as "stepping-stone students".

Stephen Butcher, Senior Manager in the Information & Analysis Unit, comments: "Previously we would just have looked at students' high-school grades and assessed their attrition risk on that basis. Now we have a much more sophisticated view not only of whether they are a risk, but also what's driving that risk."

Smarter Education — Predictive response to student attrition

Instrumented

Whenever an assessment takes place, data on academic performance is combined with demographic information from other systems.

Interconnected

A suite of IBM predictive analytics solutions analyzes the data, creates risk scores and classifies them into categories depending on the type of attrition risk they pose.

Intelligent

Armed with insight into which students are at risk and the factors that might be pushing them to leave, faculty staff can develop appropriate retention initiatives to help students stay at university.

Solution components

Software

- IBM® Analytical Decision Management
- IBM SPSS® Collaboration and Deployment Services
- IBM SPSS Data Collection
- IBM SPSS Modeler
- IBM SPSS Statistics

Services

- IBM Business Analytics Software Services

"The IBM Lab Services team made a key contribution to this project. Their dedication really made the difference in helping us ensure that the implementation was successful, and in helping us get the most out of the IBM SPSS technologies."

— Stephen Butcher, Senior Manager in the Information & Analysis Unit, University of Western Sydney

Getting predictive

To move from historical to predictive analysis, UWS worked with experts from IBM Business Analytics Software Services to deploy additional IBM SPSS solutions for text and data-mining and predictive modeling.

"The IBM Lab Services team made a key contribution to this project," says Stephen Butcher. "Their dedication really made the difference in helping us ensure that the implementation was successful, and in helping us get the most out of the IBM SPSS technologies."

UWS used the key variables it had identified in its historical data to build models in IBM SPSS Modeler that assess current students based on their demographic data and academic results (both at entry and after each course assessment). These models are managed using IBM SPSS Collaboration & Deployment Services.

IBM Analytical Decision Management is used to allocate a risk score to each student and classify them into one of the identified risk categories. These risk profiles are used to display relevant and timely content to students on the student portal.

"While we were working on the models, we found some other correlations that were quite unexpected," says Neil Durrant. "For example, students who make a lot of changes to the course units they select are at very high risk of dropping out. For the moment, we're putting these students in a separate, fourth category so that we can research why this happens."

Seamless delivery of retention analytics

In the near future, UWS plans to knit all the elements of the solution together into a seamless end-to-end process. Each time a new set of data becomes available – for example, when the results of a student assessment are released – the model will automatically re-score and re-categorize each student.

Aggregated reports and dashboards will then automatically be generated for each faculty, showing the risk profile of the faculty and prompting appropriate interventions. This will alert the faculty staff to take appropriate action, using retention strategies designed to help students in each category, instead of a one-size-fits-all approach.

"The first step in full automation is just about to go live," says Stephen Butcher. "We'll be feeding our student portal with information that is relevant to each student's risk profile. This could hopefully prompt them to reach out to the university much sooner if they need help."

Student success and financial benefits

Neil Durrant adds: "We are running a pilot program with the School of Business, where they have already designed specific retention strategies for each category. We're really excited to see the impact this has on their attrition rates over the next year.

"Cutting attrition would mean that more students complete our courses and get the qualifications they need for success in the wider world. This benefits both the student and the university. Students are able to achieve their academic and career goals, and the university mitigates the financial losses associated with student attrition, which in turn allows the University to invest further in student success. For both these reasons, retention is a top priority at UWS, and IBM predictive analytics keeps us ahead of the game."

Rob Husband, IBM Business Unit Executive for the Industry Solutions Group in Australia and New Zealand, concludes: "The visionary work of Neil Durrant's team in harnessing predictive analytics for student retention is something that other higher education institutions should definitely look to learn from."

About the University of Western Sydney

UWS is a comprehensive public university with six campuses in the Greater Western Sydney region. With approximately 3,000 staff and 42,000 students, it has a comprehensive course profile including natural and physical sciences, humanities, medicine, law and other vocational and professional qualifications. UWS is also home to a vibrant research community, with four research institutes and seven research centers.

To learn more about UWS, please visit www.uws.edu.au

About IBM Business Analytics

IBM Business Analytics software delivers data-driven insights that help organizations work smarter and outperform their peers. This comprehensive portfolio includes solutions for business intelligence, predictive analytics and decision management, performance management, and risk management.

Business Analytics solutions enable companies to identify and visualize trends and patterns in areas, such as customer analytics, that can have a profound effect on business performance. They can compare scenarios, anticipate potential threats and opportunities, better plan, budget and forecast resources, balance risks against expected returns and work to meet regulatory requirements. By making analytics widely available, organizations can align tactical and strategic decision-making to achieve business goals.

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