UNLV Learning Analytics Research Boosts Achievement

Executive summary

The University of Nevada, Las Vegas (UNLV) is a premier research university serving 29,000 students. UNLV has relied on machine data analytics to troubleshoot and manage the operational efficiency of its IT networks for several years, and now has repurposed its data to identify at-risk students and improve academic outcomes. Since deploying Splunk Enterprise, UNLV has seen many benefits including:

- Extending return on investment by reusing Learning Management System (LMS) data across IT operations, learning analytics and help desk support
- Providing personalized feedback and earlier intervention to struggling students
- Improving performance – one-third of students beat their predictions and earned an A or a B after receiving intervention materials

Why Splunk

At UNLV, the IT department provides networking, datacenter and application support for students, faculty and staff. Cam Johnson, associate director, IT Operations Center, UNLV explains that when the university adopted Splunk Enterprise it was able to solve IT infrastructure problems right out of the box. Johnson and his staff depend on Splunk Enterprise for fast IT problem resolution and to maintain maximum system uptime.

When Matt Bernacki, a UNLV professor specializing in educational psychology in higher education wanted to conduct research on student learning, he turned to Splunk Enterprise. "When someone comes to us with a challenge, Splunk Enterprise is usually involved in solving it in one way or another," Johnson says. "It's an incredibly useful solution that has many applications. We quickly realized we already had the data needed for academic research indexed in Splunk Enterprise."

Industry
- Higher Education

Splunk Use Cases
- IT operations
- Business analytics

Challenges
- Ensure maximum system uptime and reliable IT infrastructure
- Meet university's goals for higher rates of student retention, progression and completion
- Enhance student experience by extending support services

Business Impact
- Fast IT troubleshooting, reducing resolution times and maximizing system uptime
- Increasing student academic success outcomes by at least one-third
- Extending support hours significantly with enhanced security and without additional staff
- Ensuring optimal emergency preparedness while increasing campus safety

Data Sources
- Syslogs
- Blackboard Learn learning management system
- Clickstream
- Alarm System

Splunk Products
- Splunk Enterprise

Splunk Enterprise helps improve student outcomes

Bernacki uses student clickstream data from the university's learning management system, Blackboard Learn, for his research. When a student clicks on something, it writes a log that captures the content and provides insight into student actions. The discovery and mining of such logs led him to build a data dictionary that enabled him to identify the events, classify them, and gain insights into the actions students were likely to take and which ones predicted their achievement. "In psychology and educational research, a lot of our time is spent building, cleaning, and connecting data, and Splunk is a nice platform for that," Bernacki says. "Being able to build my own data sets on the fly has been really beneficial. The Splunk platform increases my confidence in the quality of my data and the speed with which I can produce results."

With the data model the team built in Splunk Enterprise, Bernacki was able to observe students' learning behaviors during early weeks of a class and build an algorithm to predict students' eventual course grade before they took the first exam. These prediction models include student actions like frequent self-testing to rehearse knowledge and use of study guides well in advance of a test.

Typically, for a class like Introduction to Anatomy and Physiology, one-half of the students fail to get the grade they need (a B) to move on to the next course, which does not align with the university's mission to support student success. By building prediction models into Splunk Enterprise that apply the algorithm and make a prediction for each student, the university was able to provide proactive feedback to 300 students who had a possibility of getting a C grade or lower in the class. Students received

> "The research is helping support the university's mission to graduate students. Retention, progression and completion are very important to us. Learning analytics is more than research—it's something we hope can turn into a tangible benefit for the university."

Cam Johnson, Associate Director
IT Operations Center, UNLV

feedback within the first four weeks of class – well before the first test – so they could adapt their learning and increase their odds for success. One-third of those students ended up earning an A or a B in the class.

Leveraging machine data beyond IT

Outside of traditional IT use cases and learning research, UNLV has identified additional use cases to apply its data. For instance, the ability to restrict access to limited sets of data from the LMS enabled the university to extend help desk hours by 30 hours weekly, without additional staff.

As another example, Splunk Enterprise indexes the university's campus alarm system data, enabling folks in the facilities department to understand what is going on in real time when they are testing the system. Facilities staff can ensure that all systems are working and maintain a high level of campus security and emergency preparedness.

What started out as an IT troubleshooting solution has now begun to solve strategic problems for the university. "The great thing about Splunk Enterprise is that it goes beyond solving typical IT problems," Johnson says. "We can look at demographic, grade or enrollment data as opportunities to help the university toward its mission."

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