Increasing Student Success, Completion, and Retention through Machine Data and Predictive Analytics

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PROJECT AIM

Increasing student achievement and retention are critical focus areas at education institutions across the nation and around the globe. UNLV has developed an innovative way of using existing student activity data, predictive analytics tools, and homegrown learning interventions to identify at-risk students and improve their academic performance in the STEM courses.

USING DATA TO IDENTIFY STUDENTS AT RISK

When students learn with technology, many applications keep a record of their learning events. We use this event log to learn about behaviors that are common, and behaviors that are associated with positive and negative outcomes. This is an example of learning analytics and involves the use and development of tools and data mining processes to analyze learning.

Learning scientists use data mining and analytics methods to investigate how individuals learn in math, science, and engineering tasks. Using data produced by users when they interact with software like Blackboard Learn (our learning management system), we can observe current students’ behaviors, match them to historical data on past successful and unsuccessful learners, and predict current students’ achievement. By employing predictive modeling, it is possible to predict future students’ grades in courses before they take a single test. This enables us to provide timely student support.

DIGITAL SUPPORTS for STRUGGLING LEARNERS

Digital messages that provide advice from past A&B earning students have been shown to improve the exam performance of students predicted to perform poorly, even on exams taken just a few days after students received a message and accessed resources.

Digital training modules that teach students the “Science of Learning to Learn” – key cognitive strategies and methods to plan, monitor, and organize study behaviors and environments can fill a skill gap for students.

Potentially Struggling Students

Students identified as unlikely to earn a B or better are notified about their potential for poor outcomes in Week 5 – the week before they take their first exam.

Digital interventions can be efficiently deployed to support students. When students learn with technology, many applications keep a record of their learning events. We use this event log to learn about behaviors that are common, and behaviors that are associated with positive and negative outcomes. This is an example of learning analytics and involves the use and development of tools and data mining processes to analyze learning.

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AN OPPORTUNITY TO IMPROVE STUDENT SUCCESS

Most universities already possess all the resources necessary to adopt this kind of data-driven student success solution. In order to build predictive models and use them to efficiently target support to students, a team must:

1. Define a student success indicator that is important to the institution (course performance, retention, re-enrollment).
2. Partner with instructors or offices that use technology to teach (LMSs, e-texts) or support many students each semester.
3. Identify where your institution houses these “activity data.” Local servers are ideal. Cloud services can pose problems.
4. Leverage existing IT and data science expertise (e.g., institutional research, faculty experts) to consolidate your data into a model. Study and analyze it to identify predictors of your target outcome. This becomes your prediction model.
5. Use an existing campus tool that can collect activity data as students engage (e.g., Splunk) to feed the real time model and apply the prediction model to these data.
6. Decide how to support learners. Digital interventions can be successful if designed by experts on student learning. Existing services (academic success coaching, supplemental instruction) can also be efficiently deployed to support students.

POTENTIAL THREAT: DATA LOST BY MOVE TO CLOUD

Where does your student data live?

The most important asset to data-driven student support is access to student activity data. This data access can be lost when services are moved to cloud-hosted providers. Be sure, when negotiating contracts with providers, that you retain access to your student data.

For More information on...

Student Activity Data
Data Models
Prediction Modeling
Designing Learner Supports

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Digitally supported learning strategy

Students who completed the training outperformed their classmates on future tests, and struggling students – students with poor prior exam scores – experienced the greatest benefits from Learning to Learn.