Strategic Perspectives: Using Analytics to Improve Student Success

EDUCAUSE VIRTUAL PRE-CONFERENCE SEMINAR 1A: USING ANALYTICS FOR DECISION SUPPORT AND INSTITUTIONAL PLANNING

TUESDAY, OCTOBER 27, 2015
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SOUTH ORANGE COUNTY COMMUNITY COLLEGE DISTRICT
Overview

• Grade Prediction Model

• Strategy: Past, Present, Future

• Future Directions
Grade Prediction

WITH MACHINE LEARNING
Grade Prediction Model

Do much for few, or do little for many?

• Early Alert models tend to leverage “clickstream” LMS data available only for a subset of students.

• SIS variables tend toward weaker predictions for everyone.
Data Scientists

- Padhraic Smyth: “ABCDF” grade prediction model
- Ted Younglove: linear regression for SIS variables
- Sandeep Jayaprakash: early alert model
Problem Structure

Millions of movies—but you’ll only view a small subset

Thousands of courses—but the average student will only take a small subset
Matrix Factorization Model

\[ r_{sc} \approx \mu + b_s + b_c + q_c^t p_s + \sum \alpha x_s \]

- \( r_{sc} \): Predicted score for student s and course c
- \( \mu \): Overall mean score
- \( b_s \): Bias for student s
- \( b_c \): Bias for class c
- \( q_c^t p_s \): Class-student interaction
- \( \sum \alpha x_s \): Weighted sum of student variables
## Predictive Analytics POC

### Predictive Analytics - Student Scoring System
Student ID: [Redacted], Gaston, Cayla

<table>
<thead>
<tr>
<th>Student ID</th>
<th>Full Name</th>
<th>College</th>
<th>Catalog ID</th>
<th>Course ID</th>
<th>Course Title</th>
<th>Units</th>
<th>Grade</th>
<th>Probability of Passing</th>
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<td><strong>96.28%</strong></td>
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Past, Present, Future

ENTERPRISE ANALYTICS STRATEGY
Microsoft Business Intelligence Platform

BI PLATFORM
- SQL Server Reporting Services
- SQL Server Analysis Services
- SQL Server DBMS
- SQL Server Integration Services

SHAREPOINT Server
- Reports
- Dashboards
- Excel Workbooks
- Analytic Views
- Scorecards
- Plans

END USER TOOLS & PERFORMANCE MANAGEMENT APPS

BI Tools bundled with Sharepoint
- Excel Services
- Dashboards

BI Tools bundled with MSFT SQL Server
- ETL
- OLAP
- Reporting

SIS
HR
MAP
Payroll
Payroll
PAST: Tabular Reporting

• We have our inFORM Data Warehouse
• Question: Should we replace the data warehouse or augment it?
• Decision: data warehousing is still necessary but no longer sufficient

• Augment with:

<table>
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<th>NOW</th>
<th>LATER</th>
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<tr>
<td>• Visualization (Viz)</td>
<td>• Predictive analytics</td>
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<tr>
<td>• Self-Service capabilities</td>
<td>• Proscriptive analytics</td>
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Present:

Visualization/Self-Serve:
Future:

Big Data
Machine Learning

alteryx
Future Directions

• MACHINE LEARNING MEETS DEVELOPMENTAL EDUCATION
• WORKDAY STUDENT
FUTURE: Predicting Remediation
FUTURE: Workday Student

A campus in the cloud.

Designed for today’s mobile generation, Workday Student is the first true cloud application for higher education. Learn how Workday Student will transform the way institutions serve and satisfy their constituents.
Questions?

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