

Sponsor: Wayne State University

Project Name: Student Momentum Pathway: From Admission to Success

May 2019

Project Description: This is Part Two of the WSU Student Success Big Data Analytics. This part aims to create an analytical framework that makes it easier to understand the status of undergraduate students, as well as their pathways through their academic programs. This framework will enable students to maximize their strengths, enable advisors to offer more timely and focused support, and assist academic program improvement to support timely degree completion. The purpose of this project is to develop an infrastructure to analyze student pathways to identify critical junctures, barriers, decision points, and intervention points tailored to the individual student and their academic pathway. This will enable an in-house faculty/advisor early alert portal system using advanced analytics to provide real-time alerts similar to those provided by the Educational Advisory Board. It will include more accurate data and better-fitting statistical models. Analyzing trajectories has significantly more computational complexity than understanding populations or other groups. As a result, this project will have significant technical and practical implications. In addition, it will be a good opportunity for Data Scientists to explore how Big Data and Machine Learning is utilized in today's American Higher Education.

Strategic Importance: This project is of extreme importance to WSU, and to our students. Student Success is a key priority in the university's 2016-2021 "Distinctively Wayne" Strategic Plan, which calls for a 50% graduation rate and the narrowing of educational disparities. Moreover, the university's accrediting body, the Higher Learning Commission, has launched new criteria directly tying student success outcomes with institutional accreditation. Even more importantly, improving the graduation rate and shortening time to degree positively changes the lives of students, their families, and their communities for generations to come. Due to WSU's diverse student population and ever-shrinking state appropriation support, more individualized and well targeted interventions are needed to maintain and expand our state budget appropriation. Currently available applications that claim to perform predictive analytics for the institutions are often very expensive and lack transparency in the predictive models they use. Taking current Education Advisory Board's Navigate for example: metrics provided are not unique to the needs of our institution and though the results are exportable, like the metrics themselves, the output fields are defined by EAB and frozen to a student's current record as EAB-Navigate does not store past term data. Additionally, the opportunity to filter and obtain student level data from dashboards for our unique population groups of focus (i.e., Ethnicity, PELL, FGEN) does not exist. At this point, EAB will not entertain customization in either the metrics or the output fields in reporting. This results in the need to create a parallel process outside of the platform that generates metrics that make sense and can be filtered to meet our own strategic needs. As a result, the numbers that those applications provide are often challenged by its users. It's time that we tap into our own resources and develop models that fit our specific student population.

Project Deliverable:

Predictive analytics: We would like to identify key attributes that will either improve (if timely intervention takes place) or negatively impact (if no intervention takes place) likelihood for students to continue or to graduate. Individual student success **needs** be calculated based on their background characteristics and the course work at certain points (term1, term2, term3, etc.).

Some specific examples:

- If a student fails a critical class (say math), how likely are they to take it in the subsequent semester?
- If they fail a critical class, and don't take it in the subsequent semester, how likely are they to graduate?
- If they go on probation, how likely are they to come off probation? To graduate? How long does it take to come off probation?
- Is it important that students complete Basic Composition in the first year?
- Are there courses that are so demoralizing that if a student fails them, they virtually never graduate?

Answers to these questions can guide important policy, program, and process changes across the campus.

Algorithms and models need to be operated against not only student academic records, but also financial aid and other campus data sources, such as Canvas.

Teams involved in this Project: Beyond faculty and students in MS DSBA, WSU's Office of Enrollment Management (EM), Office of Student Success (SS), C&IT, and Office of Institutional Effectiveness (OIE) will be actively involved in this project. It will be their mission to transfer student success domain knowledge to the Project Team. Members from these offices will meet with model developers regularly (weekly, if not more often) in order to assure that the end-product will achieve the goals.

Data, Tools, and Platforms

Student demographic characteristics, financial status, enrollment registration, course and course grade data will be made available in a secure place for the team to access. Preferred platform for the final delivery will be Power BI or other web-enabled platform.

Additional Full-time Recruiting/Employment Information

This will be a great opportunity for our Data Science program to explore Big Data used in Academia. Office of Institutional Research (part of OIE) will be hiring a full-time data scientist. It is our hope that this project can help trigger future data scientist interest in applying advanced analytics to progressing American higher education.