Decision support systems for university management have had limited improvement in the incorporation of new cutting-edge techniques. Most decision-makers use traditional forecasting methods to base their decisions in order to maintain financially affordable programs and keep universities competitive for the last few decades.

Strategic planning for universities has always been related to enrollment revenues, and operational expenses. Enrollment models in use today are able to represent forecasting based on historical data, considering usual variables like student headcount, student credit, etc. No consideration is given to students’ preferences. Retention models, associated to enrollment, deal with average retention times leaving off preferences as well.

Preferences play a major role as many students do not declare their intentions (major) immediately. Even if they do, they may change it if they find another, more attractive major, or they may even decide to leave college for external reasons.

Enrollment models have been identified to deal with three main purposes: prediction of income from tuition (in-state, out-of-state), planning of future courses and curriculum, and allocation of resources to academic departments. This general perspective does not provide useful information to faculty and Departments for detailed planning and allocation of resources for the next term or year. There is a need of new metrics to help faculty and Departments to reach a detailed and useful level in order to plan effectively this allocation of resources.

The dynamics in the rate-of-growth, the preference student have for certain majors at a specific point of time, or economic hardship make a difference when decisions have to be made for budgets requests, hiring of faculty, classroom assignment, parking, transportation, or even building new facilities. Existing models do not make difference between these variables.

This simulation model is a hybrid model that considers the use of System Dynamics, Discrete-event and Agent-based simulation, which allows the representation of the general enrollment process at the University level (strategic decisions), and enrollment, retention and major's selection at the College (tactical decisions) and Department level (operational decisions). This approach allows lower level to predict more accurately the amounts of students retained for next term or year, while allowing upper levels to decide on new students to admit (first time in college and transfers) and results on recommendations on faculty hiring, class or labs assignment, and resource allocation, among others.

This model merge both high and low levels of student enrollment models into one application, allowing not only representation of the current overall enrollment, but also prediction and retention at College and Department level, henceforth optimal classroom assignments, faculty and student allocation, among others.