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# An Adaptable Model for Improving Accessibility and Success Rates for First-Generation and Low-Income Students.

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**An Adaptable Model for Improving Accessibility and Success Rates for  
First-Generation and Low-Income Students**

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*Introduction*

As evidenced by leading educational research, today's nontraditional student constitutes the majority of the college student population (Choy, 2002). Higher education institutions have an ethical, intellectual, and financial responsibility to consider and meet the unique needs of nontraditional students. Often such a mandate is met with words of agreement, but implementing institutional measures to assess and address these needs are a completely different challenge altogether (Watson, 2009; Brock, 2010). There are numerous demographic and socio-economic variables that may qualify a student as nontraditional (Giancola, Munz, & Trares, 2008). For the purposes of this analysis, "nontraditional" refers to individuals who are first-generation and low-income students. Refining the analysis based on these two groups helps focus the educational model to more directly address the needs of this student population. Furthermore, it is important to highlight that nontraditional students often have needs as unique as the individuals themselves and therefore it is unfair to generalize about a "one-size-fits-all" model of assessing and tackling their educational obstacles (Kasworm, 2008). Patience, innovation, and creativity are needed institutionally to drive the model of educational success.

In the age of “big data” and predictive analytics, modeling is a powerful tool to identify and examine the early warning signs of educational obstacles in the nontraditional student population (Campbell, DeBlois, & Oblinger, 2007). There are four central themes that drive our proposed model: (1) the importance of formalized student advising, (2) early detection of obstacles along with subsequent interventions, (3) individualized attention to specific obstacles, and (4) identifying educational obstacles by which an institution may enact change as well as personal obstacles which an institution has very little – if any – control, save that of perhaps supportive counseling.

*Actionable Change: Themes to a Model*

These four central themes driving a model of educational success are useful only in terms of what actionable intelligence they produce. The unique obstacles facing a first-generation and low-income student indicate that any analytical model should be adaptable and malleable according to the needs of a given institution (Pascarella, Pierson, Wolniak, & Terenzini, 2004) and that serve different actionable outcomes based on student cohort characteristics. The proposed model takes into consideration the variety of educational environments including large research and mid-size universities, small liberal arts colleges, career-oriented colleges, online schools, and community colleges. Additionally, this proposed model is not intended to solve the complex, multivariate challenges of nontraditional students, but rather it aspires to help schools think

through some of the problems and then deal with both aggregate and individual data points. The model's key feature is *adaptability*.

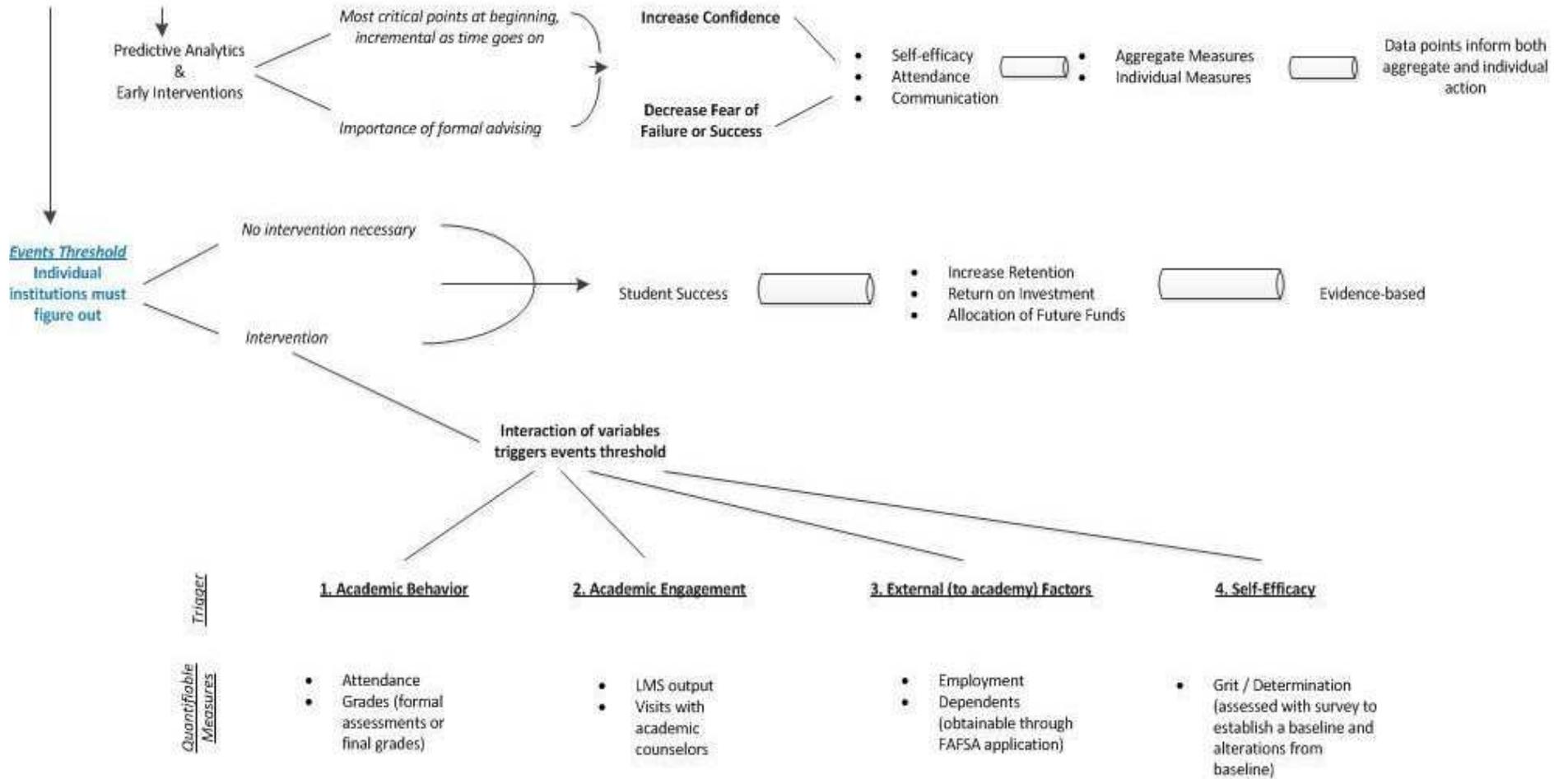
While this may be open to interpretation, it is meant to highlight how a collegiate institution might function more efficiently to help the population of nontraditional students. The efficaciousness of this analytical model rests with several key measures taken from the interplay of aggregate and individual data. These measures are quantifiable and important to all institutions of higher education. They take into account student retention across multiple cohorts (Cabrera, Nora, & Castañeda, 1993), return on investment (Stewart & Carpenter-Hubin, 2000-2001), and clarity for the allocation of future funding for student intervention programs (Hagedorn, 2005).

At this point it becomes possible to describe an analytical model to address student success in first-generation and low-income populations. The model's adaptability, aspirations for student success, and measures of key indicators provide a framework within which to describe how aggregate and individual data points become critical interlocutors of scalable change. Figure 1 on the following page is a visual representation of a working model that is both action-based with respect to the target population and adaptable to different educational institutions.

Nontraditional Students

Event-Based Points of Completion: A Model

**Milestones in a Student's Lifecycle**



\* Note: individual factors must be set by institution according to population of traditional/nontraditional students

Factors might include a designation of low, medium, or high.

*An Events-Based Model: Discussion*

*Nontraditional Students: A Model of Events-Based Points of Completion*, is both action-based with respect to the target population and adaptable to different educational institutions. It is premised on the idea that there are milestones in every student's life cycle from admissions to matriculation to graduation at which different interventions can support student success. Identifying, predicting, and acting upon the most critical milestones, typically at the beginning of the student life cycle, will determine success or failure (Calcagno, Crosta, Bailey, & Jenkins, 2007). In terms of the student life cycle, "success" is defined as completion of the academic program in order to fulfill the necessary requirements for graduation; conversely, "failure" is defined as a prolonged or permanent interruption in a course of study that leads to a student dropping out and not achieving their educational goals. Critical milestones and their metrics must be determined and applied by the individual institution. They may be purposely vague such as evaluating if students are able to obtain materials for class, or highly targeted like a measurement of the first grades assessed in a given class. The critical measurements are theorized to become more refined and tightly-spaced as the student navigates through the curriculum naturally flowing with a formal advising system whereby students receive the institutional support needed to progress.

The "top-level" features of this model are meant to engage the less quantifiable, but still critical components for increasing self-confidence and

decreasing the fear of failure (or in some students, the fear of success). These psychological components might be assessed with the metrics of self-efficacy, attendance records, and communication with faculty and staff. The amalgamation of these top-level features is important in aggregate measures and individual measures alike. The data points, working together in a qualitative and quantitative interplay, paint a more complete picture of how schools might begin to fill out what the critical measures of an events' threshold for triggering intervention might be. Specifically, if a school suggests that a study skills preparatory course might greatly benefit its students, this model might usefully measure the outcomes of the course. Through measures of self-efficacy (independent studying and skill-based confidence), attendance records, and measures of student interactions with faculty and staff, an institution might assess if a study skills course increases student confidence and decreases fear of failure (or success). Data points in the aggregate including grades and attendance and an individual's qualitative perceptions of efficacy can lead to actionable outcomes. In this case the data would be used to justify the decision to continue or discontinue the study skills course.

With these top-level metrics in place, an events' threshold can be established to make data-driven decisions on whether or not to intervene in an individual student's life cycle. An institution's determination of whether an intervention is necessary or not will determine, even in a *post hoc* analysis, a student's success or failure. To examine this a bit further, if a school elects not to

intervene on a certain data point, perhaps with grades of D or F on students' first college quizzes, a strong correlation may be seen after the fact when student dropout rates are analyzed. Conversely, the institution that decides to offer tutoring to students with D or F grades on their first college quiz may measure a correlation between higher retention and student success in later courses. As central as the intervention component is to the model, the measurements that may assess its efficaciousness tend to be a bit broader. Schools may put in measures of retention against a control group to assess the effectiveness of certain intervention programs. Likewise, a return on investment for a specific technology, such as a predictive analytics component tied into a learning management system, might be used in terms of student success through a program. Because these metrics are evidence-based, the examination of retention and return on investment may also drive administrative conversations about future allocation of funds for specific programs.

It may be argued that an educational model is only worth as much as its actionable items where the interaction of variables triggers the event threshold that indicates a need for intervention and that offers a range of potentially effective interventions. Here are some suggestions to help guide an institution to determine the interactions of certain key triggers common amongst first-generation and low-income students. The measures of these triggers are specifically quantifiable. While there may be many other possible triggers, the

ones offered in this model are those which may be easiest to quantify and, therefore, equip a school for intervention:

1. *Academic behavior.* A student's behavior can be quantified with attendance records, which tend to be binary in nature (a student is either in attendance or not), but can be captured as frequency/percentage of attendance. It is also possible to quantify and evaluate a student's grades, preferably as early in a semester as possible and often. While final grades may be good fodder for research, the actionable items for retention and student success need to be assessed early in the semester for students to seek or be offered help.

2. *Academic engagement.* A student's engagement in a given class may be quantified with the help of a learning management system (LMS). Engagement could include metrics on student discussion posts and use of other LMS course related resources and features. Additionally, it is possible to quantify types and frequencies of visits with academic counselors which may help identify students who are having multiple difficulties (frequency of visits) or students who are isolated (infrequency of visits). It is important to consider how the inverse may also indicate what should be actionable. In this case infrequent visits may indicate mastery rather than disengagement.

3. *External (non-academic) factors.* Nontraditional students typically have multiple commitments outside of their schoolwork including those

pertaining to employment and family. In terms of what is quantifiable, employment records may be gathered during orientation and number of dependents may be gathered from students' Free Application for Federal Student Aid (FAFSA) form. This type of data may assess students' outside commitments and, thus, what competes for their time.

4. *Self-efficacy*. Nontraditional students often have a determination to succeed that may be less pronounced in other student groups. While more difficult to quantify than other aforementioned measures, it is possible to develop a survey to assess a "grit" factor, or a personal determination to succeed in college. Once a baseline grit factor is determined, further quantifications of deviance from this baseline may indicate need for intervention.

The purpose of describing these four factors is to begin an institutional conversation to determine what can be measured in terms of actionable analytics. Each of the chosen factors might include a low, medium, or high indicator depending upon institutional characteristics like typical demography, curriculum structure, and scheduling considerations. Such indicators will also allow for some flexibility within the model, especially as differing institutions think about how their own internal culture might have divergent priorities.

*Implications and Conclusion*

The model presented is flexible and specialized enough to describe some of the unique needs of nontraditional students, but also generalizable enough to suggest how institutions may begin to form plans for actionable intelligence. Although it is impossible to fully portray the individual needs of nontraditional students, institutions should consider how aggregate data of students might help shape programs and interventions. Further, institutions should attempt to put into place quantifiable measures that can assess actionable change on the parts of individual students and entire cohorts. The proposed model takes the challenge of addressing the needs of nontraditional students by establishing a triggering system based on early indicators. This provides a way for institutions to turn seemingly disparate information into quantifiable metrics.

The sustained thesis in this educational model is adaptability to continuous change, variable refinement, and production of actionable metrics. The purpose of this model is twofold. In the broad sense, it may help institutions begin productive conversations to address the needs of first-generation and low-income students. In an ambitious sense this educational model provides a way forward to develop a methodology for assessing various forms of data to enact systemic change for better serving the growing nontraditional student population. In either case, the model can serve as a discussion base for the many contributors on campus and beyond that must coordinate to support student success.

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