Isaac Newton and College Completion

Vincent Tinto

Newton’s *First Law of Motion* states that an object at rest tends to stay at rest and an object in motion tends to stay in motion, and once in motion, that is when it develops momentum. It will tend to stay in motion unless acted upon by an external force.

Elucidated by Newton in 1687, the first law of motion can also be applied to study of student completion, for like objects, students at rest tend to stay at rest and students in motion tend to stay in motion. Once they gain momentum (that is, acquire more degree credits), they are more likely to stay in motion unless acted upon by an external force.

Gaining and maintaining momentum is key to student completion. Students who progress more quickly through the curriculum are considerably more likely to complete their degrees than those who do not.

This is but one reason why a number of states have begun to focus on the importance of student momentum to completion. The Washington State Board for Community and Technical Colleges, for instance, utilized the analysis of the transcripts of more than 87,000 first-time community and technical college students who entered the Washington system in the 2001–2 academic year to identify key points in the curriculum, referred to as momentum points or milestones, whose timely attainment was associated with student progress to degree completion.

For most institutions, these intermediate points of attainment include the successful completion of developmental coursework, the timely declaration of a major, and the earning, within a particular time period, of a number of degree credit hours. These momentum points were then folded into the state’s funding formula such that institutions are now rewarded when they improve the number of students attaining those points of intermediate achievement. Other states have or will soon follow suit with similar models of funding that center on the importance of student momentum to completion.

Identifying intermediate points of attainment is one thing. Helping students gain momentum and attain them in a timely fashion is another. Unfortunately, not all students are able to do so. Take the case of students who begin college academically under-prepared. Too many spend too much time on coursework for which they earn no college
credit. In some cases it may take some students two or more years to complete basic skill requirements, if they are able to do so at all.

This is but one reason why an increasing number of colleges, such as the Community College of Baltimore County, are turning to accelerated learning programs for those students who begin just one level below college-level work. In this case, rather than being placed in a stand-alone basic skills course for which students do not earn college credit, they are placed in the college-level course to which that course would have provided entry together with a study skills course that is directly connected to that course. In this manner, students earn college credit while acquiring needed basic skills.

Similarly, colleges such as the Community College of Denver have condensed what would otherwise be a two-semester sequence of either developmental math or developmental English into one semester in their FastStart program. By adopting interactive teaching and learning strategies, contextualization of developmental coursework, and cohort-based models, they have been able to substantially increase the percentage of students who complete their developmental coursework and continue in college.

A number of other institutions have taken a different approach to speeding up student progress through developmental coursework by revising the way students’ skill levels are assessed at entry. Tarrant County Community College, for instance, employs ALEKS and MyMathLab not only to assess student math skills but also provide students an online vehicle to address those skills that require improvement.

Rather than categorizing students into three math levels, each of which requires an individual course to address, Tarrant officials identify 15 math skill modules and ask students to take only the specific modules in which they need help. Using Computer Assisted Instruction, they have greatly accelerated students’ movement through developmental math and in turn reduced institutional costs. Other institutions, such as Capital Community College and Kapi’olani Community College, have successfully employed summer bridge programs that enable underprepared students to get a head start of their first year of college and therefore move more quickly to earning college credits.

Gaining momentum toward degree completion requires that students not only earn college credits but also do so in ways that lead to degree completion. Yet many students begin college undecided or change their majors, sometimes several times. This is but one reason for the growing emphasis on intrusive first-year advising merged with career counseling. In addition to the front loading of such advising and the use of first year student success courses in which advising and counseling are embedded, as they are in Florida, a number of institutions have employed web-based solutions to help students establish career and educational goals in a timely manner.
Programs such as Valencia Community College’s LifeMap and Century College’s GPS LifePlan, now widely used in Minnesota, have used such programs to increase goal setting and in turn retention and completion. Other institutions, such as Saddleback College, utilize predictive analytics to construct real-time on-line advising systems that responds directly to student advising needs as they progress through the institution.

Unfortunately, student progress is frequently constrained if not halted by the incoherent array of courses that typify most college offerings. Lacking any clear structure, students tend to wander through the curriculum in ways that undermine their ability to make timely progress. Some leave in frustration and others amass more credits than they need for program completion, that is, if they are ever able to do so. It is for this reason that a number of colleges seeking to improve rates of completion have turned their attention to curricular structure and coherence. Under the auspices of the Bill & Melinda Gates Foundation’s Completion By Design initiative, consortia of community colleges in four states -- Florida, North Carolina, Ohio, and Texas -- are working to develop coherent course pathways whose structure enable, if not require, students to move more quickly through the curriculum to the certificate or degree completion.

In these and other ways, institutions and states are coming to recognize the wisdom of Newton’s First Law of Motion and the importance of student momentum to college completion. Hopefully these and other efforts will take on a life of their own and gain sufficient momentum to transform how institutions approach the task of improving college completion.