

College Persistence Indicators Research Review

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Introduction

The following is a review of research on higher education persistence indicators. For the purposes of this document, *higher education persistence indicators* are those indicators that can be used to predict whether a student will stay in college and complete a two- or four-year degree. The review was originally conducted by researchers at the American Institutes for Research (AIR) for the Executive Office of Education, the Massachusetts Department of Elementary and Secondary Education (ESE), the Massachusetts Department of Higher Education (DHE), and the Massachusetts Department of Early Education and Care. The following has been modified to be applicable to other states considering the collection and analysis of these types of indicators.

The review of research was conducted through an extensive search of online databases and websites focused on research related to persistence indicators and college completion. The databases and search engines used in the search were JSTOR, Education Resources Information Center (ERIC), and Google. In addition, AIR higher education experts were interviewed to identify seminal research on the topic.

Findings

Research suggests that the underlying reasons for not completing a college degree are as varied as the numbers and types of students who attend college. Three decades of research focused on persistence reveals that the topic is complex in that it represents a blending of individual personal, academic, and background characteristics with higher education institutions, as well as a transition between arguably structured educational experience (high school) to a wide range of settings, climates, and cultures that characterize colleges and universities. Still, there are early signs of risk that a student will not complete a degree. These signs or indicators may allow high schools and institutions of higher education to target supports to students while they are still in school and well as to examine patterns over time. Tracking these indicators may enable higher education institutions to meet accountability measures to improve degree completion rates.

This review focuses on indicators that could be included as data elements within a state longitudinal data system in terms of the practicality of data sources and burden of collection. Therefore, to the extent possible we have limited our presentation to those persistence indicators that are prevalent in the literature, and then indicate when they are clear and measurable.

The review primarily examined potential indicators of college persistence for individual students and also examined some indicators that are specifically related to characteristics of higher education institutions. Accordingly, the findings are organized into student indicators and institutional indicators. The student indicators fall into three categories: precollege behavior, college behavior, and life experience. Finally, the last section discusses key considerations for states interested in these types of indicators.

Caveats and Considerations

Research on persistence in college spans decades and reflects shifts in thinking about access to higher education, as well as ideas about the demand and necessity of a college education. The evolution in ideas about who and why students should complete a college degree, and the assumptions about the ways in which students access college, are different today from what they may have been even a decade ago (e.g., the expectation that most students attending four-year institutions reside on or near campus). Therefore, it is likely that there are new indicators of persistence that more accurately capture information about the students who enroll in college and the ways in which they access college (e.g., taking online courses, attending part-time). Similarly, it is very possible that some indicators that are based on older research are no longer accurate predictors of whether students persist in college or not.

It is also important to note that the research on persistence in higher education tends to focus on completion of the first year (or even semester) of school, since that is the observable point at which a large number of students either continue in their studies or drop out of college. This has implications for how the research and this review are interpreted. First, the indicators identified may be more accurate for predicting the probability of first-year completion than 2- or 4-year degree completion. Second, there may be additional or different indicators (e.g., credit accumulation, level of courses taken) that are more predictive of college completion as a student progresses from year to year.

The indicators presented in this review represent possible indicators for consideration. State leaders and policymakers need ensure attention to the level of burden for collecting student-level data and defining indicators is paid, as the burden for some may prove to be too great (e.g., student-faculty interaction).

Student-Level Indicators

Student-level persistence indicators are related to students' background characteristics, preparation for college, college experience, and life experience. Together these represent a complex set of factors that affect students' ability to persist in college. The following section focuses on student-level indicators and have been organized into three broad categories: (1) precollege indicators, (2) college indicators (academic and social), and (3) life experience-related indicators.

Precollege Indicators

Precollege indicators are based on student data obtained before the student enters college and that are predictive of whether a student will persist in college. Precollege indicators are based on information prior to a student entering college. Therefore, these indicators may be used to identify students who may benefit from support while they are still in high school that could potentially improve their likelihood of persisting in college.¹ Often referred to as “college readiness,” precollege indicators tend to focus on the level of preparation a high school student needs to succeed, without remediation, in a core, credit-level course of study at a postsecondary

¹ Precollege indicators may be used as part of the selection criteria for some colleges.

institution (Conaway, 2009; Conley, 2007; D’Amico, Morgan, Robertson, & Rivers, 2010; NCES, 2004). Exhibit 1 provides an overview of precollege indicators.

Exhibit 1. Summary Precollege Indicators of College Persistence

Indicator	Description/Comments
Intensity of a Student’s High School Curriculum	<p>According to Adelman (2006) 95 percent of students completed a bachelor’s degree if they had, at a minimum had a high school transcript with the following characteristics.</p> <ul style="list-style-type: none"> ▪ 3.75 or more Carnegie units of English ▪ 3.75 or more Carnegie units of mathematics ▪ highest mathematics of either calculus, precalculus, or trigonometry ▪ 2.5 or more Carnegie units of science or more than 2.0 Carnegie units of core ▪ laboratory science (biology, chemistry, and physics) ▪ more than 2.0 Carnegie Units of foreign languages ▪ more than 2.0 Carnegie Units of history and social studies ▪ or more Carnegie Units of computer science ▪ More than one Advanced Placement course ▪ No remedial English; no remedial mathematics
Advanced Placement Results	<p>A student who scores below a three on the advanced placement (AP) exams is less likely to persist in college than student score a three or higher. One interpretation of this finding is that possessing a solid foundation in content—as evidenced by success on AP exams—is a critical component for success in college (ACT, 2009; Conley, 2007). <i>Note It is suggested that AP performance may reflect habits of mind that contribute to college success and that students who access AP courses through nontraditional means may not possess these same characteristics and may be receiving supports that allow them to be successful on AP, but not necessarily acquire the skills related to persistence (Roderick, et. al., 2008).</i></p>
End-of-Course Exams	<p>A student who scores below the proficiency level on an end-of-course exam in high school may be at risk of not persisting in college (Conley, 2007).</p>
High School Grades	<p>A student who maintains a C average or lower in high school is less likely than a student who maintains above a C-average to persist in college. Findings from one study, that is not nationally representative, suggests that students who have an A-average are seven times more likely to complete college in four years when compared to students with a C-average (Reason, 2009).</p>
SAT Scores	<p>Students who perform poorly on college entrance exams are less likely to persist in college than students who receive the highest scores on college entrance exams. Students with the highest SAT scores were found to be six times as likely to graduate from college in four years as students with the lowest scores (Ryan, 2004). <i>Note: The exact cutoff or threshold for high versus low SAT scores was not provided.</i></p>
Dual-Enrollment Program (on a College Campus)	<p>Dual-enrollment courses allow students to enroll in college-level courses (often for college credit) while still in high school. Sometimes dual enrollment programs reflect a particular career pathway (e.g., health, technology). Students who participate in dual-enrollment programs focused on career-type courses and located on a college campus are more likely to persist in college than similar students (attending college) who do not (D’Amico et al., 2010; Hughes et al., 2005). One possible reason for this finding is that participating in a dual-enrollment program exposes high-school upper classmen to the skills required to be successful at the college level (D’Amico et al., 2010; Hughes, Karp, Fermin, & Bailey, 2005). Additionally, Berger, et.al. (2008) suggest that students in early college high school programs (a specific type of dual enrollment program) who participate in college courses on a college campus are more likely to be academically successful.</p>

College Indicators

While enrolled in college, indicators related to students' academic behavior and social experience are predictive of whether a student will persist in college.

Academic Indicators

Academic behaviors center on a student's college academic performance and desire for intellectual development (Terenzini & Pascarella, 1980; Tinto, 1975, 1997). There are a number of ways in which academic behaviors can be captured as relatively simple indicators, but the primary measures in previous research are participation in remedial courses and grade point average (GPA). Again, both remedial coursetaking and GPA are results of complex interacting factors related to students' background characteristics, academic behavior (before and during college), commitment to career and performance goals, and commitment to the individual college (Donovan, 1984; Tinto, 1975, 1997). Other academic behavior indicators that may be more difficult to measure than GPA include personal goals and commitments (Kahn & Nauta, 2001; Pascarella & Terenzini, 1980; Titus, 2004) and institutional allegiance (Bean, 1980; Berger & Milem, 1999; Pascarella & Terenzini, 1980). Exhibit 2 provides an overview of academic college indicators of persistence.

Exhibit 2. Summary of *Academic* College Indicators of Persistence

Indicator	Description/ Comments
Participation in Remedial Courses	Taking remedial, non-credit bearing courses in the first year of college is an indicator of risk for dropping out of college (Conley, 2007, Adelman, 1999). For example, students who take a remedial reading course in college are 41% more likely to drop out of college (NCES, 2004). This is a particularly critical issue in that many students are entering postsecondary institutions unprepared for the rigorous course load (Conaway, 2009; Conley, 2007; D'Amico et al., 2010; NCES, 2004). In fact, recent statistics suggest that 42 percent of undergraduate students have taken a remedial course in college (NCES, 2011).
Grade Point Average (GPA)	Students who maintain a college GPA of C-average or lower are less likely to persist in college than their peers with higher GPAs and the likelihood of a student completing college diminished as his or her GPA declined (Hu & St. John, 2001; Kahn & Nauta, 2001; Tinto, 1975; Titus, 2004). According to Adelman (1999, 2006) students who are in the top 40 percent of GPAs are likely to complete a college degree
Credits Earned after First Year of College	Students who earn less than 20 credits by the end of the first year of enrollment are lessens the predictive probability that they will graduate by one-third compared to students who earn 20 or more credits in their first year (Adelman, 1999, 2006).
Credits Earned over Summer Terms	Students who earn four or more credits during summer terms improved the predictive probability that they would earn a degree. Note that African American students who earned four credits during who earned more than 4 credits during summer terms showed a significant improvement in the likelihood they would complete a college degree (Adelman, 2006).
Full v. Part-Time Status	Students who fall to a part-time status are less likely to persist in college (Adelman, 2006; Carroll, 1989). Note: Adelman (2006) found that a student who went to part time status ever in his/her college career reduced the predictive probability of completing a college degree by 30 percent when compared to students who maintain a full time status. However, given the way in which students attend college (e.g., multiple institutions, part time and full time statuses, etc.), this indicator needs to be tested.

Indicator	Description/ Comments
Continuous Enrollment v. Stop-outs	Students who stop out (a.k.a. leave college) for more than one semester (consecutively or not) are less likely to complete a college degree (Adelman, 1999, 2006). Adelman (2006) found that students who remain continuously enrolled in college, even with a part time status are 43 percent more likely to complete a college degree when compared to students who stop-out for more than one semester.
Withdrawal from or Repeating Courses	Students who withdraw from (even without penalty) or repeat multiple courses reduce the predictive probability that they will graduate by 50 percent (Adelman, 1999, 2006). The threshold identified is for students who withdraw from or repeat 20 percent or more of courses (Adelman, 2006).
Student Goals/Major—Personal Goals and Commitments	Students who have high expectations and strong performance goals are more likely to persist into their sophomore year (Kahn & Nauta, 2001; Pascarella & Terenzini, 1980; Titus, 2004). In addition, choice of major and the degree to which it aligns with the goals of a student is critical. One study suggests that a student’s choice of major may affect this commitment. Results indicate that African American students who were in high-demand majors (business, health, and engineering/computer science) were more likely to persist than African American students in other majors. One interpretation posits that this reflects an alignment between students’ goal of short-term economic returns and their desire to obtain a college degree that has a direct application and stronger short-term economic return (St. John, Hu, Simmons, Carter, & Weber, 2004). As a persistence indicator, personal goals may be difficult to measure, and student major (field of study, when declared) needs further examination as a potential persistence indicator. The way in which this indicator is captured must be tested because there is some evidence that a student’s vision does not significantly impact the likelihood that a student will complete a college degree (Adelman, 2006).
Completing a Two-Year Degree and Transferring to a Four-Year Institution	Students who complete a two-year degree in a community college and then transfer to a four-year college are more likely than students who start in a four-year institution to complete a college degree (Adelman, 2006; Cejda & Kaylor, 2001; Hoachlander, Sikora, & Horn, 2003) Note: A single transfer from a 2-year institution to a 4-year institution increases the predictive probability that student will complete a college degree, but more than one transfer is negatively associated with the predictive probability that a student will graduate (Adelman, 2006).

Social Indicators

Students’ social experience while in college is captured by indicators that focus on the degree to which a college student interacts with peers and faculty, as well as with his or her school associations (e.g., participates in extracurricular activities) (Terenzini & Pascarella, 1980; Tinto, 1975, 1997). Research suggests that the greater the involvement in peer group interaction, the more likely a student is to identify with an institution, and thus is more likely to persist (Berger & Milem, 1999; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; Pascarella & Terenzini, 1980; Titus, 2004). In addition, while social integration appears to be an important factor for all students, it may be particularly so for women. One study found that among women who had high performance goals, the quality of their relationship with their peers was most strongly related to their likelihood of persistence; the same pattern did not hold for men (Terenzini & Pascarella, 1980). Exhibit 3 provides an overview of social experience college indicators of persistence.

Exhibit 3. Summary of *Social Experience* College Indicators of Persistence

Indicator	Description/ Comments
Participation in College-Affiliated Extracurricular Activities	Students who do not participate in peer-group events such as extracurricular activities, school associations, or social activities with other students in college are less likely to persist in college (Berger & Milem, 1999; Kuh et al., 2008; Pascarella & Terenzini, 1980; Titus, 2004).
Student–Faculty Interaction	Students who have more student-to-faculty formal and informal periods of contact are less likely to withdraw from college (Berger & Milem 1999; Pascarella & Terenzini, 1980; Tinto, 1975, 1997). These indicators may be difficult to measure.

Life Experience Indicators

Life experiences can have a direct effect on persistence, in some cases by altering the degree to which a student is able to focus on their college education. Previous research suggests that experiences such as being a single parent, being the first member of your family to attend college, or coming from a low-income household pose hurdles for college students and are associated with lower rates of persistence (Dowd & Coury, 2006; Elkins, Braxton, & James, 2000; Ishitani, 2003; NCES, 1998; Raley & Kuo, 2011; Sibulkin & Butler, 2005; Somers, Woodhouse, & Cofer, 2004; Stoutland, 2011; Tinto, 1975; Yakaboski, 2010). These experiences may affect students’ engagement in and focus on college (e.g., Bean, 1980; Bean & Metzner, 1985; Bean & Vesper, 1990; Cabrera, Nora, & Castañeda, 1993; Dowd & Coury, 2006; Elkins, et al., 2000; Raley & Kuo, 2011; Sibulkin & Butler, 2005; Tinto, 1975; Yakaboski, 2010). Exhibit 4 provides an overview of life experience indicators of persistence.

Exhibit 4. Overview of Life Experience Indicators of College Persistence

Indicator	Description/ Comments
Availability and Access to Financial Assistance	The awareness and knowledge of how to access financial assistance as well as the availability of financial assistance (Swail, 2003) may affect a student’s decision to persist in college, but in ways that are not entirely clear. With the increasing cost of attending postsecondary institutions during the past 30 years, and the increasing reliance on financial aid to cover the cost of attending school, the amount of financial assistance and its availability has become an indicator of college persistence (Nora, 1990; Voorhees, 1985). The relationship between financial assistance and persistence has been shown to vary in different studies. For example, some studies suggest that the use of subsidized loans, such as non-campus (e.g., Pell grants) and campus aid (e.g., Perkins loans) may be related to persistence (e.g., Nora, 1990; Voorhees, 1985). In contrast, another study suggests subsidized loans are negatively related with persistence, and that no form of financial aid is significantly linked with degree attainment (Dowd & Coury, 2006). Although financial assistance may be related to persistence, a clear financial aid-related indicator cannot be derived from the existing literature. <i>Note: This indicator may also be related to other categories such as precollege, college, and institutional indicators.</i>
First-Generation College Student	A student who is the first in his or her family to enroll in postsecondary institutions is at greater risk of not persisting in college (Dowd & Coury, 2006; Sibulkin & Butler, 2005; Yakaboski, 2010). <i>Note: This is also related to the “support” indicator below.</i>

Indicator	Description/ Comments
Single-Parent Student	A student who attends school while also being a single, full-time parent is at greater risk of not persisting in college (cites). One study showed that in some instances this link between single parenthood and college persistence may be mitigated by institutional supports available at postsecondary institutions (Raley & Kuo, 2011).
Working While Attending School	Related to financial need, working for more than 20 hours per week is associated with a likelihood that a student will not persist in college (Raley & Kuo, 2011). In 2010, approximately 51 percent of all college students participated in the labor force (Bureau of Labor Statistics, 2011). As expected there are differences in the types of students who work during college and those who do not. For example, full-time students were much less likely to work than their part-time counterparts. Asian students were much less likely to work than white, black, or Hispanic students (Bureau of Labor Statistics, 2011). In addition, students with college-educated parents were less likely to work during the school year than students with parents who are not college-educated (Raley & Kuo, 2011). <i>Note: This is related to “access to financial resources” and “support” indicators.</i>
Support	The absence of a home or community environment that is supportive of college and college completion increases the likelihood that a student will not persist in college. Research suggests that family support and encouragement of college-going students is related to persistence (Bean, 1980; Bean & Metzner, 1985; Bean & Vesper, 1990; Cabrera et al., 1993; Reason, 2009). As an indicator this may be difficult to measure.

Institutional Factors

Research suggests that some characteristics of higher education institutions are related to college persistence and completion rates (Bean, 1980; Berger & Milem, 1999; Terenzini & Pascarella, 1980; Tinto, 1975; Titus, 2004). Specifically, institutional factors refer to the conditions, availability, and invested resources targeted at the learning environment, including the quality of classroom instruction and the availability of academic and social student supports.

Exhibit 5. Overview of Institutional Indicators of College Persistence

Indicator	Description
Quality of Classroom Instruction	Students who find classroom instruction neither clear nor effective (based on survey evaluation data) may be less likely to persist to graduation (Pascarella, Seifert, & Whitt, 2008). Classroom experience can be measured through teacher evaluations. <i>Note: If the evaluations could be identifiable by student, it may be possible to use these data as an individual student indicator.</i>
Institutional Resources	Institutional resources are the amount of financial resources devoted the academic programs and supports within an institution. Institutions that have lower levels of funding for the administration and curriculum development, libraries, and instruction technologies have lower rates of persistence (CITES?). One study suggests that a 1 percent increase in expenditures led to a quarter of a percent increase in graduation rate (Ryan, 2004). Academic support expenditures include resources allocated to academic administration and curriculum development, libraries, and technological support for instruction could be examined as institutional persistence indicators. Resources that are devoted to programs that are dedicated to increasing academic involvement and integration can lead to increases in college completion rates. <i>Note: Academic support expenditures influence the college experience (academic and social) of students and may in this way be related to higher persistence rates. This is especially true for minority and nontraditional students most at risk (Ryan, 2004).</i>

State Persistence Indicators for Consideration

Exhibit 6. is an overview of the student and institutional indicators and provides considerations for states.

Exhibit 6. Overview of Student and Institutional Indicators of College Persistence for Consideration

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
State Assessments—MCAS	Scoring at a proficient level or higher on the 10th grade MCAS are less likely to take remedial courses in college (an indicator of risk of not completing a college degree).	The indicator needs to be validated for college completion.	x					Conaway, 2009
Intensity of a Student's High School Curriculum	<p>According to Adelman (2006) 95 percent of students completed a bachelor's degree if they had, at a minimum had a high school transcript with the following characteristics.</p> <ul style="list-style-type: none"> ▪ 3.75 or more Carnegie units of English ▪ 3.75 or more Carnegie units of mathematics ▪ highest mathematics of either calculus, precalculus, or trigonometry ▪ 2.5 or more Carnegie units of science or more than 2.0 Carnegie units of core ▪ laboratory science (biology, chemistry, and physics) ▪ more than 2.0 Carnegie Units of foreign languages ▪ more than 2.0 Carnegie Units of history and social studies ▪ or more Carnegie Units of computer science ▪ More than one Advanced Placement course ▪ No remedial English; no remedial mathematics 	The research is based on the high school graduating class of 1992. Also, the use of Carnegie units may be changing and moving toward performance standards.	x					Adelman, 2006

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
Advanced Placement Results	A student who scores below a 3 on the advanced placement exams is less likely to persist in college, because possessing a solid foundation in content is a critical component for success in college.	Although this has been found to be a predictive indicator of college completion, there is some research that suggests the rapid expansion of AP participation has made this a less predictive indicator of persistence.	x					Act, 2009; Conley, 2007; Roderick, et al, 2008
End-of-Course Exams	A student who scores below proficiency is at risk of not persisting in college.	Data may not be consistently available. There may not be state-validated end-of-course exams.	x					Conley, 2007
High School Grades	A student who maintains a C average or lower is increasingly less likely to persist in college than students with higher averages.	The indicator needs to be validated.	x					Reason, 2009
SAT Scores	A student who performs poorly on college entrance exams is less likely to persist in college.	The specific risk threshold must be defined through a state validation process.	x					Reason, 2009; Ryan, 2004
Dual-Enrollment Program (on a College Campus)	Dual enrollment courses allow students to enroll in college level courses (often for college credit) while still in high school. Sometimes dual enrollment programs reflect a particular career pathway (e.g., health, technology). A student who participates in a dual-enrollment program focused on career-type courses and that is located on a college campus is more likely to persist in college. Participating in a dual-enrollment program exposes high school upperclassmen to the skills required to be successful at the college level.	The indicator needs to be validated within the state.	x					D'Amico et al., 2010; Hughes et al., 2005

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
Participation in Remedial Courses	Participation in remedial courses in college is an indicator of risk that a student may not persist in college.	The indicator needs to be validated within the state.		x				Conaway, 2009; Conley, 2007; D’Amico et al., 2010; NCES, 2004; 2011
Grade Point Average (GPA)	Students who maintain a grade point average (GPA) of C or lower were found to be less likely to persist in college when compared with student who maintain a grade point average that is above a C (especially in the first year of college), and the likelihood of a student persisting decreased as his or her GPA declined.	The indicator needs to be validated within the state.		x				Hu & St. John, 2001; Kahn & Nauta, 2001; Tinto 1975; 1994; Titus 2004
Personal Goals and Commitments	A student who has few or poor academic and career goals may have less probability of completing college. Choice of major and alignment with student goals.	The data necessary to inform this indicator need to be clearly defined. The research is based on a survey of students. There may be data on the college application that could be used to capture this information (e.g., a student selects a major or applies as undecided) The data necessary to inform this indicator need to be clearly defined. The research is based on a survey of students. There may be data on the college application that could be used to capture this information (e.g., a student selects a major or applies as undecided).		x				Kahn & Nauta, 2001; Pascarella & Terenzini, 1980; St. John, et al, 2004; Titus, 2004

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
Credits Earned after First Year of College	Students who earn less than 20 credits by the end of the first year of enrollment are lessens the predictive probability that they will graduate by one-third compared to students who earn 20 or more credits in their first year (Adelman, 1999, 2006).	Must be validated in the state with attention to differences between 2- and 4-year colleges.		x				Adelman, 1999, 2006
Credits Earned over Summer Terms	Students who earn four or more credits during summer terms improved the predictive probability that they would earn a degree. Note that African American students who earned four credits during who earned more than 4 credits during summer terms showed a significant improvement in the likelihood they would complete a college degree (Adelman, 2006).			x				Adelman, 2006
Continuous Enrollment v. Stop-outs	Students who have more student-to-faculty formal and informal periods of contact have a reduced likelihood of withdrawing.	The indicator needs to be validated within the state.		x				Adelman, 1999, 2006
Withdrawal from or Repeating Courses	Students who withdraw from (even without penalty) or repeat multiple courses reduce the predictive probability that they will graduate by 50 percent (Adelman, 1999, 2006). The threshold identified is for students who withdraw from or repeat 20 percent or more of courses (Adelman, 2006).	Variation in the policies for withdrawing and/or repeating courses may vary among institutions and influence the predictive probability of this indicator or contribute to variation in the predictive probability of this indicator across institutions. The indicator needs to be validated for the state.		x				Adelman, 2006

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
Completing a Two-Year Degree and Transferring to a Four-Year Institution	Students who complete a two-year degree in a community college and then transfer to a four-year college are more likely to complete a college degree.	The indicator needs to be validated within the state.		x				Cejda & Kaylor, 2001; Hoachlander et al., 2003)
Participation in college affiliated extracurricular activities	A student who does not participate in peer-group events such as extracurricular activities, school associations, or social activities with other students is more likely to drop out of college.	This indicator must be defined and tested. Data on student participation in college functions or programs may be used to determine risk.			x			Berger & Milem, 1999; Kuh et al, 2008; Pascarella & Terenzini, 1980; Terenzini & Pascarella, 1980; Tinto, 1975, 1997; Titus, 2004
Student-Faculty Interaction	Students who have more student-to-faculty formal and informal periods of contact have a reduced likelihood of withdrawing.	This indicator must be defined and tested. One possible indicator could be class size, hypothesizing that this would increase student and faculty interaction. Another indicator to be tested could be nonclassroom-based learning opportunities led by faculty such as seminars and special projects.			x			Berger & Milem 1999; Pascarella & Terenzini, 1980; Tinto, 1975, 1997

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
Availability and Access to Financial Assistance	The availability of financial support for students may impact college persistence.	While financial assistance may have some impact on persistence, findings in the research suggest that this factor is still not fully understood, and therefore is not included as a possible indicator of persistence. This is an indicator for consideration, but it will need to be validated for the state.		x		x		Dowd & Coury, 2006; Ishitani, 2003; Nora, 1990; Somers et al., 2004; Stoutland, 2011, Swail, 2003; Voorhees, 1985
First-Generation College Student	A student who is the first in his/her family to enroll in postsecondary institutions is at greater risk of not persisting in college.	These data may be available or collected. The indicator needs to be validated within the state.				x		Dowd & Coury, 2003; Sibulkin & Butler, 2005; Texas Guaranteed, 2006; Yakaboski, 2010
Single-Parent Student	A student who attends school while also being a single full-time parent is at greater risk of not persisting in college. In some instances, this indicator may be mitigated by institutional supports available at postsecondary institutions.	These data may be available or collected. The indicator needs to be validated within the state.				x		Raley & Kuo, 2011

Indicator	Description	Considerations	Indicator Categories					Research
			Pre-College	College-Academic	College-Social	Life Experience	Institutional	
Working While Attending School	A student who works more than 20 hours a week during school is at greater risk of not persisting in college.	Data on the number of hours students work while attending school must be collected.				x		Bean, 1980; Bean & Metzner, 1985; Bean & Vesper, 1990; Cabrera et al., 1993
Support	Research suggests that support and encouragement of college-going students are much more important than originally thought, in that factors external to the school, including family approval and encouragement, will have an effect on a student's decision to persist.	This may be difficult to measure in a single indicator, but it may be assessed imperfectly using multiple indicators (e.g., first-generation college student).				x		Bean, 1980; Bean & Metzner, 1985; Bean & Vesper, 1990; Cabrera et al., 1993; Reason, 2009
Quality of Classroom Instruction	Students who report that an institution's classroom instruction is clear and understandable are more likely to persist.	Data on teacher evaluations could be used to capture this information. In addition, this could become a student-level indicator if evaluations were identifiable by student.					x	Pascarella et al., 2008
Institutional Resources	Institutions that have lower levels of funding for the administration and curriculum development, libraries, and instruction technologies have lower rates of persistence. Especially those resources related to academic support (e.g., academic administration, curriculum development, libraries and instructional technology).	Indicators on finances would need to be tested and validated within the state to identify key funding thresholds.					x	Ryan, 2004

Recommendations

Persistence indicators, once validated using state data, can be important individual student and institutional measures that may be used as levers to improve a system of higher education. Still, the availability of individual student data at the higher education level is currently limited, although precollege indicator data are available and may be a good starting point when testing persistence indicators. When considering additional student-level data elements to include in a longitudinal data system, as mentioned in the *Caveats and Considerations* section of this document, a balance between the burden of collecting the data and the value it adds to the predictive probability of a student completing college must be weighed. A possible solution is to conduct a pilot study that includes a small number of higher education institutions with the intent of identifying the indicators that are predictive, as well as evaluating the degree of burden for collecting these data.

Another important recommendation focuses on the appropriate use of persistence indicators. There is a danger that the increasing pressure holding institutions of higher education accountable for college completion rates may bring about an unintended consequence of limiting students' access to higher education institutions. For example an institution may consider changing the thresholds and practices of accepting students to the institution based on students meeting thresholds on precollege indicators. The intent of identifying persistence indicators is to improve higher education institutions to monitor students in need, observe patterns of need (or risk of not completing college) among the students who attend the institution and develop structures, supports and processes to improve college completion rates.

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