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Defining and Measuring Academic Success

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Despite, and perhaps because of its amorphous nature, the term ‘academic success’ is one of the most widely used constructs in educational research and assessment within higher education. This paper conducts an analytic literature review to examine the use and operationalization of the term in multiple academic fields. Dominant definitions of the term are conceptually evaluated using Astin’s I-E-O model resulting in the proposition of a revised definition and new conceptual model of academic success. Measurements of academic success found throughout the literature are presented in accordance with the presented model of academic success. These measurements are provided with details in a user-friendly table (Appendix B). Results also indicate that grades and GPA are the most commonly used measure of academic success. Finally, recommendations are given for future research and practice to increase effective assessment of academic success.

Our discussion leaves open, for the moment, the definition of success other than to imply that without learning there is no success and, at a minimum, success implies successful learning in the classroom. (Tinto & Pusser, 2006, p.8)

It is not surprising researchers hesitate to define what constitutes student success. The term has been applied with increasing frequency as a catchall phrase encompassing numerous student outcomes. The term ‘academic success’ is only slightly narrower with the nuanced descriptor ‘academic’ intended to limit the term’s application to the attainment of outcomes specific to educational experiences. The proliferation of studies concerned with identifying constructs that promote academic success is likely connected to the overall assessment movement and increasing pressures for institutions to evidence student learning and development. Assessing the psychological and psychosocial processes of learning and development have always been complex; however, such measurement is made increasingly difficult when the outcome of interest is unclearly defined. In fact,

Terenzini (1989) argues that primary tenet of good assessment is to clearly articulate what it is you are attempting to measure. We contend the term academic success currently functions as an amorphous construct that broadly incorporates a broad range of educational outcomes from degree attainment to moral development.

Ambiguity associated with the definition of academic success is partially attributed to its inherently perspectival nature. Varying constituents view success, and thereby academic success, differently. For example, while the chair of an English department may not consider utilizing alumni’s career promotion histories as an indicator of academic success, a director of career services almost certainly would. In this example, the faculty member may argue academic success refers specifically to the acquisition of specific knowledge and skills demonstrated through completion of courses. The administrator may in turn argue academic success refers to ability for graduates to obtain and advance in occupations within, or related to, their degree fields. Both arguments are valid within the

current amorphous construction of academic success and the necessary application of the term within the contexts of departmental goals for students. This broad application of the term limits the ability of educators and administrators to clearly examine academic success and thereby prioritize actions intended to increase institutional effectiveness. In other words, when all things are student success, how do educational professionals make tough decisions about where to invest scarce fiscal, human, and temporal resources?

Astin's (1991) Inputs-Environments-Outcomes (I-E-O) Model serves as the theoretical framework for our study. The origins of the model come from Astin's examination of a graduate program's ability to produce PhDs. Astin questioned to what extent a program's outputs were a condition of the quality of its inputs. Early explorations convinced Astin that accurate assessment required correctly parsing student inputs, the educational environment students experienced, and student outcomes. Pascarella and Terenzini (2005) further clarify Astin's framework saying:

According to this model, college outcomes are viewed as functions of three sets of elements: inputs, the demographic characteristics, family backgrounds and academic and social experiences that students bring to college; environment, the full range of people, programs, policies, cultures, and experiences that students encounter in college, whether on or off campus; and outcomes, students' characteristics, knowledge, skills, attitudes, values, beliefs, and behaviors as they exist after college. (p. 53)

The I-E-O model serves as a theoretical framework for this study because it provides us with a way to clearly identify academic success as an outcome and, therein, create a focused definition of academic success unclouded by aspects more accurately defined as inputs or environment.

An initial conceptual framework (Figure 1), based on Astin's I-E-O model and our preliminary review of higher education literature, is included here to demonstrate the changes that occurred to our own conception of the term as our study was being conducted. This initial framework of academic success is comprised of academic achievement; acquisition of knowledge, skills, and competencies; and, persistence and retention. We included academic achievement as an outcome that captures the quality of students'

academic work such as course grades or GPA. Student learning is included to capture outcomes related to specific institution or program learning outcomes, including cognitive and affective skills. Finally, persistence and retention are included as a measure of students' academic progress. These terms represent a similar idea from two perspectives: persistence refers to degree completion, which could occur at multiple institutions, and retention refers to an institution retaining students during their academic careers, for instance from first to second year. These three pieces constitute a basic model fraught with complications, for instance student learning in a course should be mirrored in that course grade and thereby the attainment of course credits which lead to degree completion. So what then is academic success? Our purpose in this project is to add to this discussion through an analytical review of the literature.

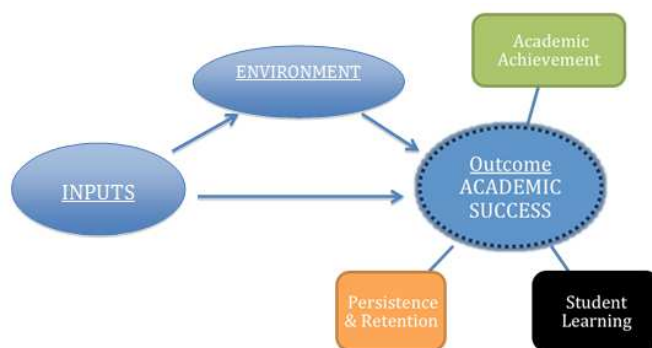


Figure 1. Conceptual Framework for Examining Academic Success

Purpose

The purpose of this analytic literature review is to define “academic success” and examine its measurement in educational research. Through our initial literature review we found that Kuh, Kinzie, Buckley, Bridges, & Hayek (2006) released an expansive literature review, *What Matters to Student Success*, that offered an overly broad definition of academic success. Given this seminal work, we seek to (1) explore the definition of academic success in the literature to both evaluate and critique Kuh et al.'s definition, and (2) examine how academic success has been operationalized within educational research, specifically in light of Kuh et al.'s work.

Methods

Literature Search

Our literature search began with an initial examination of higher education literature utilizing the Educational Resources Information Center (ERIC), EBSCOhost, and Google Scholar databases and the search term 'academic success'. These searches yielded several research articles largely within the field of higher education. In an effort to examine broader perspectives, we then expanded our search to explore the fields of sociology, psychology, career assessment, and K-12 education because of their common participation in aspects of educational research.

As an initial foray into these additional academic fields we utilized key word searchers in ERIC, EBSCOhost, and JSTOR databases with two foci: First, attention was given to author identified key words to expand the breadth of our searches. This attention included expanding our search from 'academic success' to also include the terms like 'academic achievement', 'student success', and 'student learning'. Second, this examination led to several outcomes related to academic success such as GPA, critical thinking, self-efficacy, cognitive development, and non-cognitive development. In an effort to increase the validity of our data, only peer-reviewed articles and sponsored reports were collected from these searches. These foci provided a broad range of articles examining student success from a variety of perspectives.

We utilized the Web of Science Citation Index to identify the most highly cited peer-reviewed articles (relative to their year of publication) among the works secured through our initial literature searchers. Next, we used the reference lists of the most highly cited works to identify other relevant literature. In effect, the Web of Science Citation Index provided a measure of depth to the keyword search process by providing other relevant literature from the citations of the literature found in the first two rounds of literature searches. As a result, articles were gathered from over 20 peer-reviewed academic journals including *Harvard Educational Review*, *Journal of Career Assessment*, *Journal of College Student Development*, *Journal of Educational Psychology*, *Journal of Higher Education*, *Practical Assessment, Research, & Evaluation*, and *Research in Higher Education*. Finally, we sought the expertise of the Assistant Head of Library Learning Services for The Pennsylvania State University Libraries who specializes in education

and behavioral sciences to ensure the quality and breadth of the literature search.

Analytic Process

During the literature search, documents were compiled and annotated with textual citations with special attention towards to items: (1) how the author(s) defined academic success; and, (2) what measurements were used to operationalize academic success for any empiric studies. The literature review continued until saturation (Bogdan & Biklen, 2007) of definition and measurement was reached. Saturation is a somewhat subjective research term, often used in qualitative research to describe the point during data collection where emergence of divergent perspectives ceases. We sought to operationalize saturation of our data (literature) through the incorporation of various academic fields and by following citation trees. Once saturation was met in our data collection process, it was clear Kuh et al.'s (2006) report reflected a comprehensive portrayal of the various definitions of academic success represented in the research literature. Consequently, our focus was concentrated upon an investigation of the accuracy of Kuh et al.'s definition and an analysis of how academic success has been measured in educational research prior to and in light of the comprehensive definition presented by Kuh et al.

A grounded theory approach was utilized in designing the coding structure used to analyze the definition of academic success (Charmaz, 2006; Glaser, 1992). This approach permitted us to first use open coding to allow for emergent definitions of academic success. Next, categorical coding was employed to establish themes across open codes for comparison and contrast across the definitions (Maxwell, 2005). This coding system can be characterized as bottom-up, or moving from a specific to more broad structure. In coding for the measurement of academic success, we utilized a top-down coding system, where measurements were first coded into broad categories such as 'grades', 'critical thinking', and 'affective outcomes'. These broad categories were then more narrowly coded as specific methods and instrument types. Due to its categorical nature coding was performed by the primary investigator; however, the process involved constant team consultation and a peer audit to increase trustworthiness.

Limitations

The limitations of this study primarily pertain to our literature review. While we took many steps to thoroughly widen the scope of literature to include multiple fields and have sought to provide a thorough review of the ways academic success are defined and measured in the literature, due to this topic's proliferation, there may be literature not included in our review. In part, this is due to the truly exhaustive review of the literature related to student success found in Kuh et al.'s (2006) report, which drew on over 900 pieces of literature. As such, the limitations of our literature search are diminished by the exhaustive inclusion of literature in this seminal report.

Findings & Discussion

In light of the seminal work found in our initial literature review, we have focused our examination, and subsequent findings, to advance educational research with three contributions. First, we provide an exploration of literature in multiple academic fields beyond those synthesized by Kuh et al.'s (2006) review to question the consistency of Kuh et al.'s definition. Second, we offer a theoretical and conceptual critique of Kuh et al.'s definition in an attempt to provide a revised definition and model of academic success that is not only representative of the literature but also is theoretically grounded for appropriate use in educational research. Third, we provide a comprehensive review of the various instruments used to operationalize and measure various aspects of academic success. This third objective is presented in an easily accessible format for practitioners and researchers to draw from and add to (Appendix B).

Defining Academic Success

In the following sections the findings of our review examining the definitions of academic success found in the literature are presented. We begin this presentation with an evaluation of Kuh et al.'s (2006) definition of academic success in relation to the literature examined in this study. Based upon the results of this evaluation, the following section provides a critique of that definition grounded within the findings of this study its theoretical framework. Finally, we present refined definition and revised conceptual model of academic success resulting from the study's findings.

Evaluation of Kuh et al.'s definition. The stated purpose of Kuh et al.'s (2006) report was to synthesize relevant literature and provide a broad definition of student success. The report aptly recognizes that students do not come to their college experiences as blank slates and therefore some are better prepared to succeed academically than others. However, at the same time there are experiences, pedagogies, and contexts that can, and do, have measurable effects on students' academic success. In light of the report's purpose, the authors synthesize a definition of student success based upon the literature as:

...student success is defined as academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of educational outcomes, and post-college performance. (p. 5)

To be literal, this definition is specifically for 'student success'; however, based upon the literature reviewed we have found the terms 'student success' and 'academic success' used interchangeably. For example, in a study on community college distance education Yen & Liu speak broadly about students' success yet measure this term solely using final course grade—clearly an academic outcome variables (2009).

Initial coding analysis of these definitions produced 19 open codes for the definition of academic success (e.g., academic achievement, perception of learning environment, academic self-efficacy, etc.). These 19 open codes were then recoded to comprise eight definitional categories: academic achievement; engagement; satisfaction; acquisition of knowledge, skills, and competencies; persistence and retention; attainment of learning objectives; career success; perception of learning environment; and academic self-concept. Finally, categories were coded for key concepts where each of the seven of the nine categories fit almost verbatim into Kuh et al.'s (2006) definition. Academic self-concept was placed into acquisition of attainment of educational objective as it was referenced in relation to a course or program outcome. Perception of learning environment was encapsulated by the broader term satisfaction. Table A1 (located in Appendix A) contains a comprehensive

list of articles investigated along with the definition¹ of academic success presented in the article.

Based upon the results of our analysis of definitions of academic success used in the literature, we find Kuh et al.'s (2006) definition of success inclusive of the multitude of nuanced definitions present on academic success. This is evidenced by the emergent themes present in the literature review and by the definition excerpts (Table A1). By its very nature and purpose, Kuh et al.'s definition of success is very broad. This has resulted in an inclusive—yet still amorphous—definition lacking clarity and operationalization. A theoretical critique of Kuh et al.'s definition is therefore needed to advance and expand the term's use and viability.

A critique. In our introduction we identified Astin's (1991) I-E-O model as the theoretical underpinnings of this study. Astin's model has served as a foundation for countless studies related to college student outcomes and, perhaps most notably, as the basis for Terenzini & Reason's (2005) conceptual framework for studying college impacts. Terenzini & Reason argue that sound conceptual models must disentangle pre-college characteristics and experiences, college experiences, and outcomes. Kuh et al.'s definition of academic success includes seven distinct—while somewhat overlapping—parts: academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of learning outcomes, and post-college performance. A theoretical critique of this definition would require that each part align conceptually. Since academic success is itself an outcome, each subsequent construct used in its definition should also be outcomes. Six of the seven aspects of Kuh et al.'s definition are conceptually aligned with academic success as an outcome construct. The exception is “engagement in educationally purposeful activities.”

Engagement, specifically, student engagement is a term typically used to refer to one of two concepts, (1) students' psychological investment or willingness to invest time in educational behaviors (Chapman, 2003), or (2) a more general reference to student involvement in educational activities (Kuh, Kinzie, Schuh, Whitt, &

Associates, 2010). While these distinctions are subtle, they are necessary. The view of student engagement as student involvement would conceptually fall into experience, and therefore may not be an appropriate addition to the definition of academic success. In contrast, viewing student engagement as psychological desire or motivation to participate in learning could be conceptualized as an outcome. In our review of the literature however, the development of interest in learning or interest in a specific field (or major) is usually specifically stated as such. For example, Harackiewicz et al. (2002) examined whether student engagement in an introductory psychology course indicated subsequent level of student interest in pursuing psychology as the major field of study. Moreover, even if student engagement were used to describe a psychological outcome, we suggest it is not a congruent aspect of academic success but rather a mediating variable for the other six aspects of academic success in Kuh's definition.

A revised definition and model. It is with this critique in mind that we present an amended definition and conceptual model of academic success (Figure 2). Based on our findings we define academic success as inclusive of academic achievement, attainment of learning objectives, acquisition of desired skills and competencies, satisfaction, persistence, and post-college performance.



Figure 2. York, Gibson, & Rankin Revised Conceptual Model of Academic Success

¹ Specific textual references are included in Table A1 if provided by the author(s), otherwise a paraphrasing of the definition is provided.

We include academic achievement for its obvious depiction of students' academic performance and for its intended representation of academic ability. We also include the attainment of learning objectives and the acquisition of desired skills and competencies within our model as separate arms of academic success because of the ways in which they are spoken about in the literature; however, in our effort to theoretically critique the term academic success we find a significant amount of overlap between these three "spokes" of our model. We argue academic achievement should be a direct result of attaining learning objectives and acquiring desired skills and competencies. However, we find a conceptual reason to separate academic achievement as it captures only a students' performance ability and not necessarily their learning. In a very real sense, academic achievement is a threshold assessment—it captures a student's ability to meet performance criteria. In this way, grades are intended to measure learning or knowledge; in other words, they are proxy measurements intended to capture attainment of learning objectives and acquisition of skills and competencies. We find it conceptually helpful to separate academic achievement from the attainment of learning objectives and acquisition of skills and competencies because its nature as a proxy and because it is almost always referenced in an aggregate form (grade in a course or GPA).

Choi (2005) describes successful completion of course activities by students as ultimately improving students' academic achievement. While it is true in this instance Choi uses the term 'success' to refer to completion of course assignments and the term 'academic achievement' to describe GPA, both terms refer to traditional measures of academic student success (i.e. grades and GPA). Parker, Summerfeldt, Hogan & Majeski (2004) use the terms 'academic achievement' and 'academic success' interchangeably. At one point, the goal of their study is described as "examining the relationship between emotional intelligence and academic achievement" (p. 163). At another point, the goal of the study is described as attempting to predict "academic success from emotional intelligence variables" (p. 163). Like Choi (2005), Parker et al. (2004) defined success as academic achievement (GPA). Indeed, the bulk of the literature reviewed focused on academic achievement when defining or measuring academic success (Bunce, &

Hutchinson, 1993; Choi, 2005; DeFreitas, 2012; Dennis et al., 2005; Finn & Rock, 1997; Gore, 2006; Harackiewicz et al. 2002; Pace, 1984; Tracey, Allen & Robbins, 2012; Tracey & Sedlacek, 1985; Trueman & Hartley, 1996; Zajacova et al., 2005).

Conversely, we argue attaining learning objectives and acquiring desired skills differ only in semantics. While literature on academic success speaks of the accomplishment of learning objectives as categorically separate, we find the term 'learning objective' is promulgated in assessment literature and to simply mean the stated goals of an educational course or program which includes the acquisition of content knowledge, domain knowledge, skills, and competencies (Banta, Lund, Black, & Oblander, 1996). We conclude that learning objectives are only slightly broader in scope. For instance, a particular course may state increased community engagement as an intended learning objective and, by its strictest definition, one may argue this learning objective is not a skill or competency, but a disposition. In the literature we find many studies separate these ideas—especially as they speak about the way these things are measured, which will be discussed in greater detail in the following section. Therefore, we have kept these items as separate "spokes" and instead offer the caveat that we find very little theoretical distinction among them.

Similar to academic achievement, satisfaction is included as an additional proxy component of our model of academic success. While satisfaction is certainly important to a variety of institutional constituents, we argue it is not a component of academic success and rather an outcome capturing perceptions of institutional fit, climate, or students' goal achievement. In turn, these important contextual aspects of students' wellbeing greatly impact their ability to succeed academically; in fact, Beghetto (2004) argues that student motivation provides perhaps the greatest contribution to students' academic success. Concordantly, satisfaction is an outcome variable that provides a measurement for contextual elements often seen as necessary to the learning environment and prerequisites for academic success.

The overwhelming majority of students indicate degree completion is a final goal of their educational journey (Pascarella & Terenzini, 2005). We include persistence over retention because persistence corresponds to students' continued progression in an academic degree despite institutional transfers or

stopping out. In this respect, we also argue persistence can and should capture individual students' academic goals across multiple programs of study and in various institutional contexts. Persistence is therefore included in our model of academic success to capture the focus, drive, and forward progression needed by students to complete a program of study. Finally, our model includes career success (also known as "post-college career performance"). As mentioned in our introduction, the definition of academic success often expands depending on the goals of specific institutional constituents. We argue since vocational training is a prominent outcome in American higher education, it is appropriate for our model of academic success to include post-college career performance.

Measuring Academic Success

In the following section we present the findings of our examination of how academic success is operationalized in the literature. Instruments found in the literature that empirically measured the tenets of academic success offered in our model are discussed and summarized in Table B1 (located in Appendix B). These instruments are examined in light of our conceptual model of academic success and a discussion is offered regarding their validity. Next, we include a discussion of how academic success has been operationalized in light of Kuh's report. We conclude with a discussion concerning the primary ways academic success has been operationalized throughout the literature compared with the model of academic success that we have presented.

To our knowledge, there is no complete presentation of empiric instruments available to educational researchers seeking to measure various aspects of academic success despite being perhaps the most researched outcome in education. Table B1 contains a list of the instruments seeking to measure various aspects of academic success found in our comprehensive review of the literature. These instruments are organized according to the categories of academic success presented in our model. Many of the instruments seek to measure multiple outcomes and are listed as such. Where available, we have also sought to provide authorship, access, validity, and reliability information or sources for the instruments. We encourage continued expansion of our inexhaustive list.

Unsurprisingly, we found that academic performance in the form of academic achievement, accomplishment of learning objectives, and acquisition of skills and competencies were the most frequently measured aspects of academic success. Moreover, academic achievement was measured most frequently of all. Academic achievement is almost entirely measured with grades (by course or assignment) and GPA. This is unsurprising since grades and GPA measures are by far the most readily available assessments for institutions. The accomplishment of learning objectives and the acquisition of skills and competencies can be measured at the course, program, and institutional level. Assignments and course evaluations are the primary means of measuring these things at the course level. Programmatic evaluation usually occurs by some sort of curricular capstone or in some fields by an independent professional entity; such as teaching or engineering accreditation. As noted before, there is considerable overlap between the measurement of attaining learning objectives and the acquisition of skills and competencies. Figure 3 offers our model for academic success with the addition of several instruments that correspond to the respective spoke we believe the instrument is designed to capture. In the case of attaining learning objectives we included instruments designed to capture knowledge and cognitive skills. As for the acquisition of skills and competencies, we included instruments that intend to capture affective development.

As Figure 3 indicates, we found two primary measurements for persistence: retention between particular years of college—most commonly between the first and second years, and degree attainment rates. The literature suggests satisfaction was often captured either by course evaluation or through larger nationally available institutional surveys such as Cooperative Institutional Research Program's (CIRP) The Freshman Survey (TFS) or the National Survey of Student Engagement (NSSE) (Harackiewicz, Barron, Tauer, & Elliot, 2002; Lizzio, Wilson, & Simons, 2002). These institutional studies often contain several subscales utilized in a variety of institutional assessment efforts. Several of these subscales could be utilized to capture various parts of our academic success model. For instance, TFS contains an academic skills scale in addition to a satisfaction scale.

Finally we found career success was used as a measurement of academic success in two distinct ways:

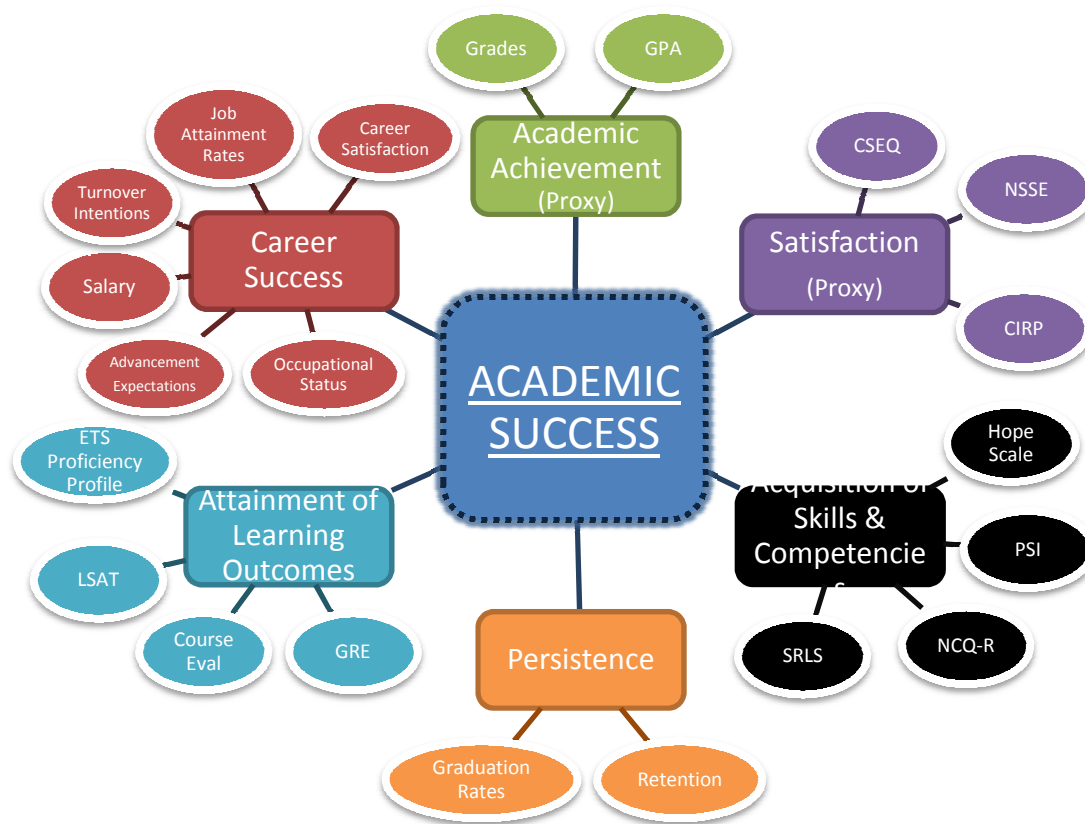


Figure 3. York, Gibson, & Rankin Operationalized Model of Academic Success

extrinsic and intrinsic (Ng, Eby, Dorensen, & Feldman, 2005).² Extrinsic measures of career success include things like job attainment rates and promotion histories. For example, in a study examining university characteristics and early job outcomes Colarelli, Dean, and Kronstans, (1991) operationalized career success via annual performance ratings provided by supervisors. Intrinsic measures of career success include measures of career satisfaction or professional goal attainment. Fralick (1993) provides an excellent example of intrinsic measures in a study where success was measured via participants' perception of having had the opportunity to develop potential, realize ambitions, enhance career options, and increase self-satisfaction. Between these two, we found studies more often focused on extrinsic measurements—perhaps because of their clearer operationalization.

² Much of the information we provide in this article on career has been greatly informed by colleagues on our research team who have been working in tandem with us on defining career success. For more information please see Eury, Merson, Minetto, & Rankin (In Progress).

Thus far, we have offered a survey of academic success measurements present throughout the literature. This information has been presented in accordance with our conceptual model; however, taking a broad look at the measurements used also offers some interesting insights. Table 1 includes the aggregate frequencies of the categories of measures utilized across the empiric literature. As we have previously mentioned, GPA tops the list as most often used measurement of academic success accounting at 54.8% making academic achievement the most commonly assessed aspect of academic success within the empiric pieces we reviewed. Studies utilizing measures of critical thinking and retention were the next most prevalent at 19.4%, and academic skills and engagement measures come in third at 16.1%. It is interesting to note that two of the three most utilized measures, GPA and retention, involve data that is the most readily available to institutions; therefore, their prevalence may be due convenience and accessibility over a narrow conceptions of aspects of academic success.

Table 1. Types of Outcomes Measured as ‘Academic Success’

Total n=31		% (n)
Academic Achievement	GPA	54.8 (17)
	Grades	12.9 (4)
Career Success	Extrinsic	9.7 (3)
	Intrinsic	6.5 (2)
Satisfaction	Overall College Experience	9.7 (3)
	Course Experience	3.2 (1)
	Degree Completion Rate	3.2 (1)
Persistence	Retention	19.4 (6)
	Critical Thinking	19.4 (6)
Acquisition of skills and competencies	Academic Skills	16.1 (5)
	Affective Outcomes	12.9 (4)
	Engagement	16.1 (5)
Attainment Learning Objectives	Institutional Objectives	12.9 (4)

Note: Articles that used multiple measures were counted in each category. The percentages give are calculated as the number of articles that utilized the category of measure out of the total number of articles examined.

Conclusion and Recommendations

In summary, our review has provided two primary conclusions regarding the definition and measurement of the term ‘academic success’. First, the definition of academic success is necessarily complex and broad; however, it is often misused within educational research to encapsulate all generally accepted desired outcomes. Our review suggests a theoretically grounded definition of academic success that is made up of six components: academic achievement, satisfaction, acquisition of skills and competencies, persistence, attainment of learning objectives, and career success. Second, we found incongruence in the literature between how academic success was defined and how it was measured. These findings suggest that despite reports that have advocated for more detailed views of the term (Kuh et al., 2006), the bulk of published researcher continues to narrowly measure academic success as academic achievement; more specifically, operationalized as grades and/or GPA. This is problematic for researchers and practitioners for three reasons:

- First, research has indicated that grades and GPA are not always accurate measures of learning or growth in cognitive capabilities (Arum & Roksa, 2011; Young, 1990)—an issue of validity. Validity of this measure is imperative for postsecondary professionals not only because of increased public scrutiny around the “true” value of education but also because students’ learning is central to institutional missions. Educational research and assessment narrowly focused on only one aspect of academic success’s construct—an indication of our study—create a limitation to the current body of literature and our understanding of what contributes to student success.
- Second, a narrow operationalization of academic success within educational research and assessment is statistically inconsistent as grading approaches differ greatly within and between institutions resulting in unreliable measurements. Inaccurate assessment of student growth and learning may contribute to the inability to review the construct between institutions.
- Third, educational researchers’ use of the term ‘academic success’ when their work is actually only examining a narrow portion of that concept may result in findings and conclusions that are not generalizable. Finally, narrow and perspectival conceptions of the construct of academic success may decrease cohesion amongst institutional constituents regarding institutional priorities.

These challenges are not new to educational research. We offer that our model will assist in mitigating these challenges. The complexity of the construct of academic success is addressed our model and responds to the growing diversity of students’ postsecondary purposes and goals. Specific recommendations are specified below.

Strengths and Limitations

Beyond the previously discussed limitations of the literature search, it is important to note the limitations and strengths of the review. The primary limitation of the review is that we construct the definition of academic success based upon the ways that educational scholars define and operationalize the term within the literature. This constructivist method does not include the voices of students, parents, or labor market leaders; except as they are captured by academic literature. A strength of the review is that it not only considered the

ways that scholars defined academic success, but it also compared these constructs with the ways in which they were enacted through measurement. Another strength of the review is that it considers the impact of past literature seeking to clarify the concept of academic success upon the work of the field.

Implications for Practice and Future Research

We offer three implications for practice and future research. First, we encourage future practitioners and researchers to expand their definition of academic success beyond that of academic achievement. For practitioners and researchers engaged in assessing the educational efficacy of programs or interventions, we suggest an approach that evaluates specific growth of cognitive ability and/or acquisition of skills or learning outcomes. We also encourage the consideration of participants' aspirations or educational goals within the design. Similarly, we encourage postsecondary institutional assessments that include post-college measures beyond the common measurements of persistence and satisfaction. These added measures will provide a more robust assessment of students' academic success.

Second, we encourage increased research on the relationship between grades and academic achievement, especially among under-served groups of students (such as low-income students, first-generation students, students with learning disabilities, veterans, etc.). Though there is increasing research on the relationship between grades and academic achievement, the field of education continues to rely heavily on these variables as the standard for assessing academic success. Moreover, many of the scales available in the literature that assess academic skills rely heavily on the use of grades and/or GPA. As Table 1 indicates, research on academic success has disproportionately favored this aspect. We hypothesize this is largely the result of the accessibility of this data and because of its connection to persistence. Future research, however, is needed to explore the interaction of other non-environmental and contextual factors upon students' success. In particular, we encourage researchers and practitioners to consider utilizing Bronfenbrenner's ecological approach to better capture these influences (Renn & Arnold, 2003).

Third, we recommend that assessment practitioners take advantage of the list of measures, and

in particular subscales, we have compiled in Appendix B. While this list is not exhaustive, we offer the list as a starting point to aid in the creation of research and assessment that more accurately reflects the student experience. We encourage researchers and practitioners to add to the list as new measures are created. Where possible we have provided published information about the measures' validity and reliability. It should also be noted that none of the authors of this article are in any way affiliated with any of these measures. Our anecdotal consultations with assessment professionals have suggested that many well-formed subscales are not taken advantage of in this work. For example, the academic skills subscale developed by the Higher Education Research Institute or the Collegiate Learning Assessment (CLA) might be helpful when attempting measure acquisition of skills and competencies. Many of the measures included have subscales that can be used to more accurately capture academic success.

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Appendix A

This table contains the specific textual references contained in the literature we reviewed beyond Kuh et al.'s (2006) exhaustive review. If the piece did not contain a specific textual definition of academic success, a paraphrasing of the term's definition is provided.

Table A1. Literature Foundation of the Definition of Academic Success in the York, Gibson, & Rankin Model of Academic Success

Reference	Theme	Definition
Åge (2007)	Acquisition of Skills and Competencies, Academic Achievement	Academic success is related to several factors like academic achievement, course experience, and student's perception of the learning environment.
Arum et al. (2011)	Acquisition of Skills and Competencies	Student Performance, as measured by increases in CLA (academic rigor).
Astin et al. (2000)	Acquisition of Skills and Competencies, Academic	Academic success if referred to as "academic performance" (p. ii). "Service participation shows significant positive effects on...academic

	Achievement	performance (GPA, writing skills, critical thinking skills)..." (p. ii).
Bunce, & Hutchinson (1993)	Academic Achievement	Grades. Course completion/grades were the outcomes measured and identified with academic success.
Choi (2005)	Academic Achievement	Term Grades. "Academic performance in the study was measured by composite points earned in a course" (p. 197). "Academic performance (cumulative GPA)" (p. 199).
Colarelli et al. (1991)	Career Success	Early job outcomes: job offers, employment status, job performance, and job satisfaction & organizational commitment. The authors suggest GPA is a predictor of job outcomes.
Cole et al. (2009)	Engagement	"A model of first-year engagement therefore should recognize the inputs as being both trait-like or stable (gender, race, SES) and situational (for example, high school engagement, college expectations, academic motivation). This parsing of inputs into two types is an important first step before using these variables as controls or covariates in any analysis" (p. 59).
DeFreitas (2012)	Academic Achievement	GPA. "Hierarchical regression analyses were conducted to analyze the main study hypotheses with GPA as the dependent variable (see Table 3)" (p. 114).
Dennis et al. (2005)	Academic Achievement	GPA. Stated the following about academic success: "With reference to college students, academic success is a function of both personal characteristics such as mental ability, academic skills, motivation, and goals, and the characteristics of the environment, which can be conceptualized as a system of nested interdependent structures (Muuss, 1996). Although the environment includes many systems of influence, Bronfenbrenner (1989; Bronfenbrenner & Morris) has recently focused on proximal processes that involve patterns of interaction between the person and the immediate environment. Face-to-face interaction with, and support from, family members and peers are among the most common and important proximal processes for adolescents and young adults and play an important role in academic outcomes (Muuss)" (p. 224).
Finn & Rock (1997)	Academic Achievement	Academic Success defined as students with high grades, test scores and persistence levels (all of these variables constitute what the authors call academic resilience (i.e. academic success).
Fralick (1993)	Career Success	"To these students, success means having the opportunity to develop potential, realize ambitions, enhance career options, and increase self-satisfaction" (p. 29)... "It should be emphasized that success was defined as the student's subjective judgment about college achievement rather than more traditional institutionally defined measures of college success.
Galyon et al. (2011)	Acquisition of Skills and Competencies	"This study examined the relationship of academic self-efficacy to engagement in class discussion and performance on major course exams among students (N = 165) in an undergraduate human development course. Cluster analysis was used to identify three levels of academic self-efficacy: high (n = 34), medium (n = 91), and low (n = 40). Results indicated that high, medium, and low academic self-efficacy all significantly predicted levels of student participation and exam performance, but the directionality of group placement on the academic measures was different for students at the high self-efficacy level versus those at the low and mid self-efficacy levels" (p. 1).
Gore (2006)	Academic Achievement	"Academic performance (GPA) and institutional persistence (retention) data were obtained across the first 2 years of college. Data from the second study come from a large ongoing national study of the SRI. For this study, we obtained students' ASC scores and their college academic performance and persistence during the first 2 years of college" (p. 97).
Gurin et al. (2002)	Attainment of Learning Outcomes, Acquisition of Skills and Competencies	This article is looking at the impact of diversity upon learning outcomes. Learning outcomes are defined as including: active thinking skills, intellectual engagement and motivation, and a variety of academic skills. SAT scores and Grades were specifically NOT used and reasoning is given on page 13. "In the CIRP, intellectual engagement included self-rated aspirations for postgraduate education, the drive to achieve,

		intellectual self-confidence, and the importance placed on original writing and creating artistic works. The other learning outcome in the CIRP, academic skills, included self-rated academic ability, writing ability, and listening ability, as well as self-reported change in general knowledge, analytic and problem-solving skills, ability to think critically, writing skills, and foreign language skills" (p. 11-12).
Harackiewicz et al. (2002)	Academic Achievement	Broad definition: Grades, GPA and they believe another important indicator of success in education is the development of interest in a topic or discipline, and that a broader definition of success requires consideration of a wider range of predictors "We examined outcome measures of success in the short term (the first semester at college) by assessing interest in psychology, enjoyment of the class, final grade in the course, and overall GPA for the semester. We examined outcome measures of success in the long term (over the course of students' entire undergraduate careers) by assessing continued interest in psychology (the number of additional psychology credits taken), grades in subsequent psychology of additional psychology credits taken), grades in subsequent psychology classes, and overall GPA. We also examined whether students majored in psychology, another important indicator of continued interest in psychology" (p. 563)
Heckert & Wallis (1998)	Career Success	"Overall, students felt that their education would be useful in preparing them for a career in their field, competing for employment opportunities, and finding satisfying employment" (par. 16).
Jacobi (1991)	Persistence	Academic success is roughly defined as degree completion; referred to as academic achievement. "The links between mentoring and undergraduate academic success require a consideration of both the dynamics of the mentoring relationship and the dynamics of undergraduate achievement." (p. 523).
Lizzio et al. (2002)	Attainment of Learning Outcomes, Acquisition of Skills and Competencies, Satisfaction	Article connects academic success with increased learning outcomes. This article looks at academic success in two ways: hard (academic achievement), and soft (satisfaction, development of key skills). Academic Achievement—academic achievement was represented by calculating, using university academic records, students' grade point average (GPA), measured on a scale from 1 (low) to 7 (high), from the commencement of their degree to the point at which the survey was conducted" (p. 34).
Ng et al. (2005)	Career Success	"Among the many determinants of career success, individuals' human capital (e.g. education and work experience) has been shown to be robustly and consistently related to salary level, number of promotions, number of job offers, and number of developmental opportunities (Howard, 1986; Ng, Eby, Sorensen, & Feldman, 2005; Sicherman & Galor, 1990)" (p. 207).
Nora et al. (1996)	Persistence	Persistence. "The student's reenrollment status (persistence/nonpersistence) was assessed during the beginning of the second academic year" (p. 431). "Persistence was a dichotomous dependent measure of student persistence. The variable was derived from institutional records that reflected the number of hours the student was enrolled for Fall 1993 (or the beginning of the second year in college)" (p. 438).
Pace (1984)	Academic Achievement	Instrument is designed to assess the quality of students' effort and the attainment of college-related goals.
Parker et al. (2004)	Acquisition of Skills and Competencies	"When EQ-i:Short variables were compared in groups who had achieved very different levels of academic success (highly successful students who achieved a first-year dimensions of emotional intelligence. Results are discussed in the context of the importance of emotional university GPA of 80% or better versus relatively unsuccessful and social competency during the transition from high school to university" (p. 163).
Pascarella & Terrenzini (1980)	Acquisition of Skills and Competencies	Academic success is a measure of a student's academic and intellectual development. "Extent of academic integration is determined primarily by the student's academic performance and his or her level of intellectual

		development" (p. 62).
Pascarella et al. (2011)	Acquisition of Skills and Competencies	Critical Thinking. This study is an attempt to replicate the Arum & Roksa (2011) study for validation based upon student learning in the area of critical thinking. This study concludes Arum & Roksa's conclusions are confirmed in this replication, though the authors offer caution regarding the acquisition of content knowledge.
Plant et al. (2005)	Acquisition of Skills and Competencies	Academic success is associated with high academic achievement "The total amount of time that students report studying has often been examined as a potential predictor of success in school. It might seem that the more time that students spend studying, the better grades they should receive. Although students should increase their personal knowledge and skills by increasing the amount of time that they spend on relevant study activities, the relationship between the amount of study and achievement across students is less clear. Indeed researchers have consistently found a weak or unreliable relationship between the weekly amount of reported study time and grade point average (GPA) for college students (Allen, Lerner, & Hinrichsen, 1972; Beer & Beer, 1992; Gortner Lahmers & Zulauf, 2000; Hinrichsen, 1972; Michaels & Miethe, 1989; Schuman, Walsh, Olson, & Etheridge, 1985; Wagstaff & Mahmoudi, 1976)" (p. 97)
Pritchard & Wilson (2003)	Persistence	Completion of a college degree (p.18)
Snyder et al. (2002)	Academic Achievement	GPA. "As expected, Hope Scale scores provided reliable predictions about college students' academic performances over the course of their undergraduate careers. All three hypotheses were supported, with higher Hope Scale scores reliably predicting higher cumulative GPAs, a higher likelihood of graduating from college, and a lower likelihood of being dismissed because of poor grades" (p. 823).
Tinto & Pusser (2006)	Academic Achievement	"Our discussion leaves open...the definition of success other than to imply that without learning there is no success and, at a minimum, success implies successful learning in the classroom. By extension it argues that one way of understanding student success as it may be influenced by institutional action is to see it as being constructed from success in one class at a time, one upon another, in ways that lead over time to academic progress" (p. 8).
Tracey & Sedlacek (1985)	Academic Achievement	In the first article, the NCQ is related to student success through predictive ability for GPA (controlling for SAT) and persistence. Make an argument that academic success is more than just academic ability.
Tracey & Sedlacek (1989)	Academic Achievement	Same as above
Tracey et al. (2012)	Academic Achievement, Persistence	There were nine different indices of academic success examined in this study relating both to grade point average and persistence.
Trueman & Hartley (1996)	Academic Achievement	Grades. Called academic performance. "In this particular case we compared the mean scores of the three groups of students on the three measures of academic performance namely, the course-work marks, the examination scores, and the combination of these two sets of measures" (p. 207-208).
Zajacova et al. (2005)	Academic Achievement	First-year cumulative GPA, number of earned credits, and enrollment at the start of the second year. "We estimated structural equation models to assess the relative importance of stress and self-efficacy in predicting three academic performance outcomes: first-year college GPA, the number of accumulated credits, and college retention after the first year. The results suggest that academic self-efficacy is a more robust and consistent predictor than stress of academic success" (p. 677).

Appendix B

This table includes a growing collection of assessment instruments that can be utilized to measure academic success. Instruments are organized and presented by the six “nodes” of our model of academic success. This list is by no means exhaustive and we encourage others to contribute to this resource.

Table B2. Instruments used to Measure Various Aspects of York, Gibson, & Rankin Model of Academic Success

References	Name	Method	Description
<i>Academic Achievement</i>			
	GPA	Overall or Major GPA	
	Grades	Course or Assignment Grades	
<i>Acquisition of Skills and Competencies</i>			
Educational Testing Service (http://www.ets.org/proficiencyprofile/about)	ETS Proficiency Profile (formerly the MAPP- Measure of Academic Proficiency Progress)	The ETS Proficiency Profile (EPP) assesses general education skills such as critical thinking, reading, writing, and mathematics and is administered to freshman, sophomores, and upperclassman.	The ETS Proficiency Profile (EPP) assesses general education skills such as critical thinking, reading, writing, and mathematics and is administered to freshman, sophomores, and upperclassman. The test can be used to assess students and program performance for accreditation and institutional improvement and to compare with other institutions. www.aacc.nche.edu/newsevents/Events/convention2/virtualtotebag/Documents/ets1.pdf .
OAMI; Matlock, Gurin & Wade-Golden (2000)	Michigan Student Study (MSS)	Large-scale survey. Although its major emphasis is on racial and ethnic diversity, the study is also concerned with the students' reactions to issues related to gender and sexual orientation. The survey includes an active thinking subscale (7-Items).	Examines impact on students of the University of Michigan's commitment to foster campus diversity efforts and educational excellence.
ACT (www.act.org/caap/test/thinking.html)	Collegiate Assessment of Academic Proficiency-Critical Thinking (CAAP-CT)	The CAAP Critical Thinking Test measures students' skills in clarifying, analyzing, evaluating, and extending arguments. The CAAP Critical Thinking Test is a 32-item, 40-minute test.	Examines students' argumentation skills.
Insight Assessment (www.insightassessment.com/Products/Critical-Thinking-Attributes-Tests/California-Critical-Thinking-Disposition-Inventory-(CCTDI))	California Critical Thinking Dispositions Inventory (CCTDI)	The CCTDI measures the "willing" dimension in the expression "willing and able" to think critically. The CCTDI includes the following scales: Truth-seeking Scale, Open-Mindedness Scale, Analyticity Scale, Systematicity Scale, Critical Thinking Self-Confidence Scale, Inquisitiveness Scale, Maturity of Judgment Scale, and CCTDI Score Scale.	The California Critical Thinking Disposition Inventory (CCTDI) is a tool for surveying the dispositional aspects of critical thinking.

Insight Assessment www.insightassessment.com/Products/Critical-Thinking-Skills-Tests/California-Critical-Thinking-Skills-Test-CCTST	California Critical Thinking Skills Test (CCTST)	The CCTST provides an objective measure of critical thinking skills. The CCTST is a family of tests- different versions for different age levels or professional fields and includes the following scales: Total Score, Analysis, Inference, Evaluation, Deduction, Induction, Interpretation, and Explanation.	CCTST questions engage the test-taker's reasoning skills. Different questions progressively invite test-takers to analyze or to interpret information presented in text, charts, or images; to draw accurate and warranted inferences; to evaluate inferences and explain why they represent strong reasoning or weak reasoning; or to explain why a given evaluation of an inference is strong or weak.
Ennis & Millman (1985)	Cornell Critical Thinking Test (CCTT-Z)	The instrument includes 52 multiple-choice items that have sections on induction, credibility, prediction and experimental planning, fallacies (especially equivocation), deduction, definition, and assumption identification.	The Cornell Critical Thinking Test (CCTT) is available in two levels. Level Z is aimed at college students and adults (Level X is aimed at Grades 4-14).
Heppner & Peterrson (1982)	Problem Solving Inventory (PSI)	The PSI consists of 32 items (6-point ratings) and three subscales: Problem-solving Confidence, Approach Avoidance Style, and Personal Control.	The PSI was designed to assess how well individuals make decisions, specifically problem-solving abilities.
Gadzella, Hogan, Masten, Stacks, Stephens & Zascavage (2006); Watson & Glaser (1980)	Watson-Glaser Critical Thinking Appraisal (WGCTA)	The examinee is asked to evaluate reading passages that include problems, statements, arguments, and interpretations. The original version of the test (which has two alternate versions- WGCTA-A and WGCTA-B) is comprised of 80 items and can be completed in 60 minutes. The short form (WGCTA-S) is comprised of 40 items and can be completed in 45 minutes.	The Watson-Glaser Critical Thinking Appraisal (WGCTA) is an assessment tool designed to measure an individual's critical thinking skills.
CAT http://www.tntech.edu/cat/home/	Critical Thinking Assessment Test (CAT)	The instrument includes a broad range of institutions, faculty, and students across the country and is comprised of short answer essay questions.	The CAT Instrument is a unique tool designed to assess and promote the improvement of critical thinking and real-world problem solving skills.
Bar-On (2004)	Emotional Quotient Inventory (EQI)	The EQ-i is a self-report measure designed to measure a number of constructs related to EI. The EQ-i consists of 133 items and takes approximately 30 minutes to complete. It gives an overall EQ score as well as scores for five composite scales and 15 subscales (Bar-On, 2006).	The Emotional Quotient Inventory (EQ-i), EQ-360 and EQ-i: YV were developed to assess the Bar-On model of emotional-social intelligence.
Tracey & Sedlacek (1989)	Non Cognitive Questionnaire-Revised (NCQ-R)	Factor structure of the non-cognitive questionnaire-revised across samples of black and white college students. Educational and Psychological Measurement, 49: 637-648.	Non-Cognitive Questionnaire-Revised (NCQ-R)
Snyder, Harris, Anderson, Holleran, Irving, Sigmon et al. (1991)	Hope Scale	The adult hope scale contains 12 items. Four items measure pathways thinking, four items measure agency thinking, and four items are fillers. The adult hope scale (AHS) measures Snyder's cognitive model of hope which defines hope as "a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-directed energy), and (b) pathways (planning to meet goals)" (Snyder, Irving, & Anderson, 1991, p. 287).	Participants respond to each item using a 8-point scale ranging from definitely false to definitely true and the scale takes only a few minutes to complete. See Snyder (2002) for a review of hope theory and research.
Moore (1988)	Measurement of Intellectual Development (MID)	The MID is a validated essay-format instrument designed to reflect respondents' underlying cognitive structures relative to positions two to five on the Perry scale (Moore, 1988). The MID is a conservative indicator (Moore, 1998).	Attempts to examine students' underlying cognitive structures.

Attainment of Learning Outcomes

Educational Testing Services (http://www.ets.org/gre)	Graduate Record Examination (GRE)	The GRE revised General Test measures verbal reasoning, quantitative reasoning, critical thinking and analytical writing skills.	The GRE is “the most widely accepted graduate admissions test worldwide” (ETS, 2012).
Law School Admission Council (http://www.lsac.org/jd/lsat/about-the-lsat.asp)	Law School Admission Test (LSAT)	The test consists of five 35-minute sections of multiple-choice questions. Four of the five sections contribute to the test taker's score. The un-scored section, commonly referred to as the variable section, typically is used to pretest new test questions or to pre-equate new test forms. The placement of this section will vary. A 35-minute writing sample is administered at the end of the test.	The Law School Admission Test (LSAT) is a half-day, standardized test. It provides a standard measure of acquired reading and verbal reasoning skills that law schools can use as one of several factors in assessing applicants.
Association of American Medical Colleges (https://www.aamc.org/students/applying/mcat/)	Medical College Admission Test (MCAT)	Scores are reported in Physical Sciences, Verbal Reasoning, Writing Sample, and Biological Sciences.	The Medical College Admission Test® (MCAT®) is a standardized, multiple-choice examination designed to assess the examinee's problem solving, critical thinking, writing skills, and knowledge of science concepts and principles prerequisite to the study of medicine.
Collegiate Learning Assessment (http://www.collegiatelearningassessment.org)	Collegiate Learning Assessment (CLA)	An institution's average score on the CLA measures correlates highly with the institution's average SAT score ($r = 0.90$)[1]. "CLA scores reflect a holistic assessment of the higher order skills of critical thinking, analytic reasoning, written communication, and problem solving" (CLA Tech Report). The assessment consists of open-ended questions, is administered to students online, and controls for incoming academic ability.	The Collegiate Learning Assessment (CLA) is a test of reasoning and communication skills, usually aggregated at the institutional level to determine how the institution as a whole contributes to student development. It focuses on the value-added of attending the institution through assessing performance tasks and analytic writing tasks covering critical thinking, analytic reasoning, written communication, and problem solving.
ACT (www.act.org/caap)	Collegiate Assessment of Academic Proficiency (CAAP)	CAAP offers six independent 40-minute test modules. Institutions may select those modules that best reflect their mission and the goals and curricula of their general education programs. (Reading, Writing Skills, Writing Essay, Mathematics, Science, Critical Thinking). For the multiple-choice test modules, a standard score is reported on a scale that ranges from 40 (low) to 80 (high), with a mean of 60 and a standard deviation of approximately 5. For the Writing Essay Test, ACT developed a modified holistic scoring system that ranges from 1 to 6 in increments of .5. Each score reflects a student's ability to perform the writing task defined in a prompt—in a timed, first-draft composition.	The Collegiate Assessment of Academic Proficiency (CAAP) is a standardized, nationally normed assessment program from ACT that enables postsecondary institutions to assess, evaluate, and enhance student learning outcomes and general education program outcomes.

Engagement in Educationally Purposeful Activities

French & Oakes (2004); Pascarella & Terenzini (1980)	Institutional Integration Scale (IIS)	Large-scale survey. Comprised of 30 items that are used to construct five subscales: Peer-Group Interactions (7-Items); Interactions with Faculty (5-Items); Faculty Concern for Student Development and Teaching (5-Items); Academic and Intellectual Development (7-Items); and, Institutional and Goal Commitment (6-Items).	The Institutional Integration Scale (IIS; Pascarella & Terenzini, 1980), based on Tinto's (1975) theoretical framework, was developed to assess students' self-reported levels of academic and social integration.
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Satisfaction

HERI (www.heri.ucla.edu)	Cooperative Institutional Research Program (CIRP)	Large-scale survey. CIRP has several survey instruments, including The Freshman Survey (TFS), Your First College Year (YFCY) & the College Senior Survey (CSS). These surveys generally connect academic, civic, and diversity outcomes with comprehensive sets of pre-college and college experiences to measure the impact. Academic Skills Construct: 3-Items	CIRP examines the effects of the college experience.
Pace (1984); Williams (2007); Williams & Holmes (2007)	College Student Experience Questionnaire (CSEQ)	Quality of effort is a key dimension for understanding student satisfaction, persistence, and the effects of attending college. The more students engage in educational activities, the more they benefit in their learning and development.	(CSEQ) assesses the quality of effort students expend in using institutional resources and opportunities provided for their learning and development.
McInnis, Griggin, James & Coates (2000); Ramsden (1991)	Course Experience Questionnaire (CEQ)	Respondents asked to agree or disagree (on a five point scale) with 25 statements related to their perceptions of the quality of their overall course. The results are reported course by course for every university and have been widely used to support internal quality assurance processes. The questionnaire items have been grouped into four scales concerned with teaching ('good teaching', 'clear goals', 'appropriate assessment', 'appropriate workload'); a scale concerning, the acquisition of generic skills for the workforce; and a single item on the acquisition of generic skills for the workforce; and a single item on satisfaction with the quality of the course overall.	The CEQ seeks to determine how students who have just completed their undergraduate degree perceive the overall quality of their education by course.
Kuh, & Associates (2006)	National Survey of Student Engagement (NSSE)	Documents including research paper using NSSE data, nation-wide reports, and instrument reliability and validity are available online at www.nsse.iub.edu.	Student engagement represents two critical features of collegiate quality. The first is the amount of time and effort students put into their studies and other educationally purposeful activities. The second is how the institution deploys its resources and organizes the curriculum and other learning opportunities to get students to participate in activities that decades of research studies show are linked to student learning.

Self-Efficacy

Bandura (1989)	Multidimensional Scales of Perceived Self-Efficacy (MSPSE)	Large scale survey. The MSPSE is a 57-item self-reported measure with nine subscales. Each subscale comprises items rated on a 7-point Likert scale (1 = not well at all, 3 = not too well, 5 = pretty well, 7 = very well). Larger student scores indicate higher levels of self-efficacy beliefs. Internal consistency reliability (alphas ranging from .63 to .87 with an overall coefficient of .92) has been reported with a college-aged sample (Bryant & Fuqua, 1997).	Attempts to capture students' self-efficacy.
Solberg, O'Brien, Villareal, Kennel, Davis et al. (1993)	College Self-Efficacy Inventory (CSEI)	20 Item instrument consisting of three subscales. The subscales were found to have strong internal consistency and demonstrated good convergent and discriminant validity.	Attempts to capture students' self-efficacy.
Originally Locke & Wood; Adapted by Choi (2005)	Academic Self Efficacy	Academic self-efficacy was measured by the College Academic Self-Efficacy Scale (CASES; Owen & Froman, 1988) with a 7-item Likert style subscale.	Attempts to capture students' self-efficacy.
ACT (2012)	Student	The SRI is composed of 108 items that form ten	Examines psychosocial factors

	Readiness Inventory (SRI)	scales: Academic Discipline, Academic Self-Confidence, Commitment to College, Communication Skills, Steadiness, General Determination, Goal Striving, Social Activity, Social Connection, and Study Skills.	associated with academic success and college student retention.
Bandura (1998); Bryant & Fuqua (1997)	Self-Regulated Learning Scale (SRL)	Part of the MSPSE, the Self-Regulated Learning scale includes 11 items (7-point Likert scale: 1 = not well at all, 3 = not too well, 5 = pretty well, 7 = very well). This measurement attempts to capture 8 dimensions: positive self-concept; realistic self-appraisal, understanding of and an ability to deal with racism, preference for long range goals over more immediate short-term needs, support of others for academic plans, successful leadership experience, demonstrated community service, and academic interest and familiarity.	Attempts to capture students' ability to engage in self-regulated learning.

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