Academic Success Factors: An IT Student Perspective

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Executive Summary

Numerous studies have identified causal factors for academic success. Factors vary from personal factors, such as cognitive style (McKenzie & Schweitzer, 2001), to social factors, such as culture differences (Aysan, Tanrıöğen, & Tanrıöğen, 1996). However, in these studies it is researchers who theorized the causal dimensions and hypothesized the causal factors. Students were passive objects used to test the theories or to validate the hypotheses. Each researcher may have developed his or her own scheme of causal structure. These structures are not necessarily identical among researchers nor are they the same as those of students. This study has two objectives. The first is to combine the factors that contribute to academic success that have been identified in the literature and to unify them under a single framework. This is achieved by reviewing the existing literature on academic success and on categorization of academic success factors in order to develop the framework.

The second objective is to add the IT student perspective to the framework. That is to find out what factors are perceived by students as relevant to their academic success and to determine which are the most important. To this end, two surveys were administered to IT students. In the first survey, students identified causal factors related to their own academic success. In the second survey, students ranked factors according to importance. Students did not list any factors that had been previously presented in research. However, they did identify them at a more detailed level (for example, literature might look at effort as a factor, where students listed several activities that involve effort). However, students did not list some factors as important to their success that had been previously identified in the literature, most notably intelligence.

The detailed results for the two surveys are presented and discussed. Recommendations are made for institutions and faculty based on the results obtained.

Keywords: academic success factors, IT education, educational policies, college students

Introduction

A success or failure often triggers us to search for the factors that explain the outcome. There are many causal factors associated with any given event. However, we are usually interested in a particular type of event and the causal factors associated with it. In the case of educators, causal factors salient to academic success or failure are of particular interest.

Academic success, particularly as it relates to IT-related degree programs, is an important topic from the U.S. national perspective.

> "Leadership in science and technology – and networking and information technology (NIT) in particular – is essential to the Nation's global competitiveness and economic prosperity. … However, continuation of America's strong position in developing and adopting new networking and information technology is not assured. Other nations have recognized the value of NIT leadership and are mounting challenges. …" (President's Council on Science and Technology, 2007, p.9)

For network and IT specialists in particular, the U.S. is concerned that despite the growth in the supply of workers in response to the rising demand in the next decade, there will be shortfalls in the number of highly qualified workers in these areas (President's Council on Science and Technology, 2007). According to the U.S. Department of Labor the demand for employment in IT-related professions will grow much faster than the average for all occupations through to the year 2018. The Bureau of Labor Statistics projects a 53% increase between 2008 and 2018 in the number of jobs for network systems and data communications analysts, 23% for network and computer systems administrators, 20% for database administrators, and 17% for computer and information systems managers (Bureau of Labor Statistics, 2010a, 2010b). The aforementioned jobs require at least a Bachelor's degree. Therefore, recruiting and successfully graduating qualified students with a postsecondary education in these high growth and high demand career areas is important to the overall success of organizations in the U.S.

Given the high demand coupled with the declining enrollments in IS/IT programs nationwide, factors leading to the success of students in those programs are of particular interest to IS and IT educators. Programs with low enrollments are vulnerable to being cut, especially in light of declining budgets in higher education due to the poor economy. Any effort to improve the success, and thereby the retention, of students already enrolled could help improve the decline in the number of students who eventually graduate with an IS or IT major.

There are numerous studies identifying causal factors relating to academic success (see for example, Hanushek, 1996; Kinshuk & McNab, 2006; McKenzie & Schweitzer, 2001). However, the different research streams are isolated, and factors identified have not been integrated into an overall scheme. In addition, in academic success literature most factors are hypothesized by researchers, rather than by students. In other words, the approach used in previous studies represents the researchers' perspective, rather than the students'. The approach of the researcher proposing the causal factors related to academic success is meritorious as they have the expertise to do so. However, there could be important, relevant factors not examined in the literature that are missing only because students have not been asked directly what contributes to their academic success.

Given the importance of academic success, particularly for students in IT-related degree programs, the objective of this study is to contribute to the existing body of literature by organizing the various streams of research into a generalized integrated framework. In addition, the student viewpoint on factors related to their own academic success will be added to what is currently understood about factors contributing to academic success. Students are asked directly, in an open-ended survey, what factors contribute to their success. They are then asked to rank their perceptions on factors contributing to academic success derived from the literature augmented by factors identified in the first open-ended survey. The current research provides a more integrated view of the causal effect of academic success as it combines student perceptions with those factors identified in previous research studies.

Literature Review

There are many indicators of academic success, including, but not limited to, GPA, graduation rate, retention rate, annual salary the first year after graduation, and placement percentage of graduates. However academic success is defined, it is important for institutions to understand the most salient factors that affect academic success of their student body in order to improve that success rate. In addition, integrating the factors identified into a single framework will add to the overall understanding of how the factors are related. To this end, existing literature about academic success factors is reviewed.

In order to develop the framework, existing literature needs to be examined for an inventory of factors currently identified as important to academic success. The literature also needs to be examined to determine if researchers have already developed classification or categorization schemes that can be used as a starting point for the framework. In addition, if there are any studies that use empirical evidence to validate these classification schemes, these need to be reviewed as well. Therefore, the literature review consists of three parts. First, literature related to how academic success factors are categorized and how the categorization is validated by empirical studies is presented. The second section reviews studies that investigated a wide range of academic success factors, from personal factors to social factors. Finally, issues with previous research results and the lack of student perspective in most research efforts are discussed.

Categorization of Academic Success Factors

As a starting point for determining how to categorize success factors, attribution theory, a general framework that is used to categorize causal factors in many research fields, including political elections, sports events, or academic performance is examined. In his earlier work, Weiner (1974) applied attribution theory to achievement, identifying two dimensions with which to categorize causal factors: internal/external and stable/unstable. This framework has 4 categories of factors:

- Internal/Stable factor (i.e., ability and good genes).

- Internal/Unstable factor (i.e., effort and interest).

- External/Stable factor (i.e., difficulty of course or subject).

- External/Unstable factor (i.e., luck and opportunity).

Table 1 shows the 2 x 2 categorization with ability, effort, luck, and task difficulty postulated in it.

Table 1: A 2 x 2 Scheme for the Perceived Causes of Outcomes (Weiner, 1974).

	Internal	**External**
Stable	Ability	Task Difficulty
Unstable	Effort	Luck

In 1979, Weiner added another dimension, controllability, to his model (Weiner, 1979). In this later model, all external factors are considered to be uncontrollable. Internal factors can be controllable or uncontrollable (see Table 2). For instance, the height of a basketball player is considered an uncontrollable internal factor while the skill of the player is considered controllable through training.

Table 2: Third Dimension - Controllability

	Internal	External
Stable	Controllable	Uncontrollable
	Uncontrollable	
Unstable	Controllable	Uncontrollable
	Uncontrollable	

Empirical Evidence Supporting the Categorization of Factors

Several studies, both education related (Meyer & Koelbl, 1982; Schoeneman & Curry, 1990) and non-education related (Roberts & Pascuzzi, 1979), have validated the dimensions proposed by Weiner's model. In a study conducted by Schoeneman and Curry (1990), 466 undergraduate students attributed the causal factors of their behavior changes to three dimensions: internal, unstable, and controllable. Roberts and Pascuzzi (1979) conducted an experiment and asked 346 college students to identify causal factors that contributed to the outcomes of various sports situations. Forty-five percent (45%) of the time, the subjects listed ability, effort, luck, and task difficulty as the causal factors. When asked to categorize causal factors, these subjects were able to place factors within the four cells of the Weiner model 100% of the time (Roberts & Pascuzzi, 1979). These studies provided evidence in support of the 2 x 2 categorization matrix proposed by Weiner (1974). Other studies assumed the existence of the dimensions and tested the level of impact from each quadrant of the 2 x 2 matrix, i.e., levels of impact of ability, effort, luck, or task difficulty on the outcomes of events. Kovenklioglu and Greenhaus (1978) found that college students attributed their successes in chemistry tests to ability and not to luck, but attributed their failures to effort and not to ability. These early studies on categorization of success factors and the validation of these categories provide an overall structure for reviewing the literature as well as a foundation for the framework proposed in this paper.

Factors Investigated in Previous Studies

The factors identified in previous studies formed several groups that can be categorized as factors at the individual, course, family, school, and macro level. At the individual level, a group of psychologists examined how student's cognitive style, anxiety, and loneliness influenced academic success (McKenzie & Schweitzer, 2001; Ross, Drysdale, & Schulz, 2001).

At the course level, instructors' behavior, teaching methods, subject matter, and student-teacher interaction were related to academic success (Aysan et al., 1996; Mayer & Patriarca, 2007). At the family level, family demographic characteristics were observed to have a positive association with academic success (Demeulemeester & Rochat, 1995; McKenzie & Schweitzer, 2001). For instance, a "socio-cultural" learning environment in web development course was proved to be beneficial to African American students, especially female African American students (Seay, 2004).

At the school level, focus was on suspension and retention policies, school spending, and resources (Denton, Morris, & Tooke, 1981; Hulse, Chenowith, Lebedovych, Dickinson, Cavanaugh, & Garrett, 2007). At the macro level, academic success was associated with economic growth and social cohesion (Hanushek & Kimko, 2000).

To provide a summarized view of academic success research, Table 3 highlights the factors investigated by the previous studies. The order of the factors in Table 3 is arranged from personal factors to social factors.

Table 3: Factors Investigated Related to Academic Success

Factors	References
Cognitive learning styles: concrete sequential, abstract sequential, abstract random, and concrete random.	Ross et al., 2001
Learning styles: perceptual modality, distractibility, meta-cognition, analytic global tendency.	Zhang & RiCharde, 1997
Ability, effort, task, luck	Boekaerts, Otten, & Voeten, 2003
Ability, effort, task, luck, culture, gender, course subject	Yan & Gaier, 1994
Reading and writing abilities, task difficulty, study habits	Ritchey & Lewis, 1986
Effort, self-efficacy, loneliness, coherence, mood, hope	Lackaye & Margalit, 2006
Goal orientation, self-efficacy and self-regulation	Niemczyk & Savenye, 2001
Self esteem	Feick & Rhodewalt, 1997
Anxiety, locus control, critical thinking	Hulse et al., 2007
Academic, psychosocial, cognitive, demographic factors	McKenzie & Schweitzer, 2001
Age, gender, type of high school attended, nationality, parental education, number of siblings, siblings' education, living arrangement changes	Demeulemeester & Rochat,1995
Parental education and employment, student's procrastination of task, value of task, anxiety, classroom climate, support from peers, task load, instruction quality	Bruinsma & Jansen, 2007
Family income, parental education, parental involvement and hostility	Melby & Conger, 1996
Parental practices in support, reasoning, punitiveness, monitoring, and autonomy granting	Henry, Martinko, & Pierce, 1993
Three types of orientation (self, interaction, task), four cognitive styles(concrete experience, reflective observation, abstract conceptualization, active experimentation), attitude toward course and computer use; philosophy in (vocation, academic, social interaction, individual identity)	Kevin & Liberty, 1975
Support networks, depression, life events	Blumberg, 1984
Field of study, quantity of course work, and GPA of teacher	Denton et al., 1981
Amount of time spent, teacher characteristics, teacher/student interaction, classroom control, instructional (organization, integration, materials, articulation)	Connolly & McGrail, 1978
Teachers' behavior, teaching methods, commitment to study, learning environment, content of study, psychological problems, relationship with family, concern with field of study and future career, time management.	Aysan et al., 1996

Relationship with teacher, interests in assignments, feeling of competence	Daniels & Arapostathis, 2005
Student-teacher relation and interaction	McGregor, 2007
Perceived faculty support	Shelton, 2003
Teacher salaries, school spending, reduced-price or free lunch	Costrell, Hanushek, & Loeb, 2008
School expenditure, teacher ability, teacher education, teacher experience, teacher salary, teacher/student ratio, school size	Greenwald, Hedges, & Laine, 1996
Class size	Ehrenberg, Brewer, Gamoran, & Willms, 2001
Study time influences academic performance, but is moderated by study habits. Planning/scheduling not as important for short term success.	Nonis & Hudson, 2010
Social climate, academic facilities, co-curricular activities, advising, getting into classes (registration, financial aid, course availability, textbook)	Wince & Borden, 1995
Institutional factors, academic integration, social integration, campus climate, financial status	Volkwein, Valle, Parmley, Blose, & Zhou, 2000
Accountability policy	Hanushek & Raymond, 2005
Tracking policy to place and group students base on ability	Hanushek & Wößmann, 2006
Success of athletic programs	Mixon & Treviño, 2005
Retention policy	Bowman, 2005
Suspending policy	Howard, Borland, Johnson, & Baker, 2001
Government policy: education accountability in Alabama	Mathews & Hackett, 1997
State program: Families and Communities Equals Success in North Carolina	Fernandez, Campbell, & Honness, 2000
Societal health including human capital, knowledge capital and health capital	Grossman, 2008
Social and economical factors	Matuszek & Haskin, 1978
Social cohesion	Gradstein & Justman, 2000

Issues in Previous Studies and Lack of Student Perspective

The authors have not found any studies that were based on student perspectives. The typical research process was to hypothesize a theory with independent and dependent variables, design a questionnaire, collect measurements on students, and generate a result.

Another problem in the academic success research is the tautology where one dependent variable is used to test another dependent variable. For instance, success in one course is used to predict success in another (Brookshire, Crews, & Brown, 2009). The framework in proposed in this paper will help researchers identify independent variables for the proposed categories.

Many studies involving pre-college students use secondary data, such as Public Elementary - Secondary Education Finance Data from http://www.census.gov/govs/school/. At the college level, some studies have used well established scales, such as the achievement motive scale and the Watson Glaser critical thinking appraisal (Mehrabian, 1968), and many studies used self-designed questionnaires.

To summarize the review of the literature, academic success factors have multiple categories, research has multiple levels, within a single level, findings were not conclusive, and the student perspective was not considered.

Proposed Generalized Framework

Based on the review of the literature, a generalized framework for categorizing the factors related to academic success is proposed. In the framework, factors can be categorized into seven groups:

- Personal (motivation, commitment, study, etc.)

- Family (income level, marital status, number of siblings, etc.)

- Peer-related (classmates, study group members, friends, etc.)

- Subject/content (course structure, grading policy, textbook, etc.)

- Institutional agent (faculty, advisor, staff, etc.)

- Institutional (location, program reputation, scholarships, etc.)

- Social (economy, crime rate, etc.)

The groups start at the personal level and move to broader levels such as at the institutional and social level. Weiner's model is used to further categorize each of the seven groups into six dimensions: internal/external, stable/unstable, controllable/uncontrollable of internal factors. This ultimately leads to 42 categories (7 x 6). Table 4 provides examples of 6 categories for personal factors.

In the current study, a subset of the model proposed in Figure 1 is used. We combined the factors generated from the first survey (in Table 5) and the factors from the literature review (Table 3), and formed seven groups of factors(in Table 6). The factor groups corresponded to factors proposed in the generalized framework in Figure 1: personal, subject/content, institutional agent, institutional, and social. The authors then applied Weiner's model to the personal factors to create three subgroups. The seven resulting categories are identified in Table 6 as the headings for each group of factors.

Table 4: Examples of Various Dimensions in the Proposed Generalized Framework

Factor Group	Dimension	Examples
Personal	Internal/Stable/Controllable	Basketball skills due to training
	Internal/Stable/Uncontrollable	Player's height due to gene
	Internal/Unstable/Controllable	Effort invested in studying
	Internal/Unstable/Uncontrollable	Mode at the day of exam
	External/Stable/Uncontrollable	Difficulty of the exam
	External/Unstable/Uncontrollable	Luck
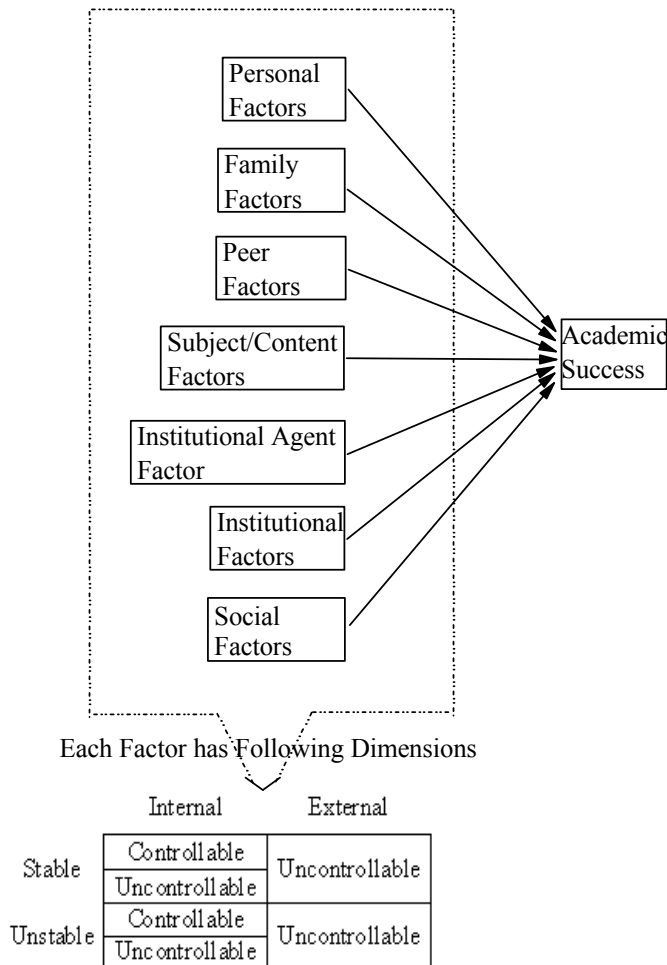
Figure 1. Proposed Generalized Framework

Methodology – Two Surveys

As mentioned previously, prior research studies have not considered student perceptions when examining the causal structure of factors that contribute to academic success or failure. Students may have been surveyed, but researchers theorized the causal dimensions and hypothesized the causal factors while students were passive objects used to test the theories or to validate hypotheses. The causal dimension structures were not necessarily identical among research studies nor are they necessarily the same as those of students. This study uses a more direct approach having students identify causal factors and then rank the factors they identified in conjunction with those identified in prior research studies. Given the exploratory nature of the study, we consider this study as our first phase in exploring a different approach to identify academic success factors. We started by conducting two surveys with small samples sizes. We hope that with a solid literature review and a fresh approach, this study will provide a framework and a list of factors for future studies.

Survey 1: A Survey to Identify Causal Factors for Academic Success

To determine what factors are critical to academic success according to student perceptions, an open-ended paper-based survey was administered to 131 upper-level (third year or beyond) students at a university located in the southeastern United States. These students were enrolled in selected core courses in the three information technology (IT) related majors at the authors' institution: Information Systems, Information Technology, and Computer Sciences. The rationale for using upper division students is that they have the academic experience to recognize the factors that contribute to their academic successes or failures. Given the exploratory nature of this study, the sample is limited to students in IT-related programs. This sample was chosen as a matter of convenience.

The students were provided with a survey with 10 blanks and asked "What does it take to be successful in college? Please give ten factors that lead to academic success or failure." Responses were collected from 131 students. Content analysis was performed on the student responses. Content analysis involves making objective inferences from the students' responses and categorizing those responses (Strauss & Corbin, 1990; Weber, 1985). Table 5 provides a compiled list of the factors identified by students as well as the percentage of students who cited that factor. Any factor that was identified by less than 5% of the students was eliminated for brevity.

Table 5: Factors Contributing To Academic Success or Failure Cited By Students

Factors	%
Study	55.73
Attend class	42.75
See professors/ get to know them/ communicate/ availability	41.98
Friends support/ make friends	35.11
Time/task management	31.30
Participate/ ask questions/ pay attention/ don't sleep in class	27.48
Good professors (motivated, interesting, well-prepared)	26.72
Balance between school, social life and home life	25.19
Stress outlet (exercise, outside life, have fun, me time, etc.)	24.43
Sleep	23.66
Do homework (graded and ungraded), practice	21.37
Commitment/Dedication/ Hard work	19.85
Don't procrastinate/ Be Proactive	19.85
Be organized	17.56
Network (other students/mentors)	16.79
Read	16.03
Good notes/ take notes	16.03
Use study groups	14.50
Family support	14.50

No financial concerns	14.50
Extra-curricular activities (in school and outside)	12.98
Group work/ teamwork	12.21
Diet/ exercise	12.21
Finding/ asking for help	12.21
Flexible work schedule/ job or no job	11.45
Focus	10.69
Drug free/ no peer pressure/ limit or no alcohol	9.92
Self-motivation/ Initiative	9.16
Persistence/ perseverance/ desire	9.16
Language barrier with professor	9.16
Prioritize	8.40
Set goals	8.40
Choose appropriate major	8.40
Reliable transportation	7.63
Price of books (buy online, cheaper)	6.87
Patience	6.11
Positive attitude	6.11
Good living environment (roommates, etc.)	6.11
Tutors	6.11
Discipline	5.34
See advisor (academic, career, professor)	5.34
Don't over schedule	5.34
Have an academic plan	5.34
Review for test provided (study guides, format of test)	5.34
Types & frequency of tests (multiple choice, essay, related to material)	5.34

Survey 2: Students Rank the Factors Generated from the Literature and from Survey 1

The factors identified in the first survey were combined with the factors identified in previous research studies to create the list of factors shown in Table 6. To create the list of factors in Table 6, the researchers did the following:

1. Reworded the factors, so the meanings of factors are clear and mutually exclusive.

2. Categorized the factors into groups of personal, course (subject/content), professor (institutional agent), college (institutional), and social.

3. Within the personal factor group, formed subgroups using Weiner's dimensions of internal/external and controllable/uncontrollable of:

-   personal traits or characteristics (personal – internal/uncontrollable),

-   personal behaviors (personal – internal/controllable), and

-   personal environment (personal –external/uncontrollable).

Students ranked the factors in each category by placing a 1 next to the factor which is the most important in that category, 2 next to the second most important, and so on. The survey was administered to 43 junior and senior students enrolled in upper level IT-related courses at a university located in the southeastern United States. The sample for this survey was independent of the first survey. The average ranking of each factor is presented in the second column of Table 6. The lower the average, the more important the factor is to academic success.

Table 6: Ranking Factors within Each Category

Personal Traits or Characteristics (Internal/Uncontrollable)	AVG
Self-motivation/initiative	2.47
Commitment and dedication	2.93
Positive attitude, self esteem and confidence	3.63
Persistence and perseverance	4.05
Ability to focus under stress with distractions	4.30
Patience	5.16
Ability to communicate and interact within a group or a team	5.49
Personal Behaviors (Internal/Controllable)	
Attend class, pay attention, participate, and ask questions	3.44
Study (invest time and effort in studying)	5.44
Maintain a schedule and keep track of due dates and tasks	6.47
Do assignments	7.53
Manage stress (balance school work with exercise, hobbies, and social activities)	7.56
Prioritize personal needs, school, work, family matters, and social activities	8.16
Regular sleep and a healthy diet	8.72
Choosing the appropriate major and understanding course requirements	9.56
Have a well organized system of studying (read, review, summary, outline, self-test)	9.56
Organized living environment and study materials	10.74
Set up an academic plan from the start and stick with it	11.12
Maintain a reasonable course load, balance easy courses with tough courses	11.30
Have limits to time spent partying, video gaming, drinking, etc.	11.70
Use study groups	12.77

See professor outside class or during the office hours	12.84
Gain work experience, hands-on experience, and internship in related fields	13.67
Participate in extra-curricular activities (student associations, volunteer work, etc.)	14.14
Exercise regularly	14.33
No drugs or alcohol	14.93
Practice religion and go to church	15.88
Personal Environment (External/Uncontrollable)	
Positive relationship, interaction, and support from friends	5.07
Positive relationship, interaction, and support from family members	6.26
Good living environment (close to campus, clean, quiet, safe, computers and Internet access, study rooms)	6.40
Positive relationship, interaction, and support from faculty	6.42
Positive relationship, interaction, and support from classmates	6.95
Positive relationship, interaction, and support from roommates	8.19
Positive relationship, interaction, and support from boyfriend/girlfriend	8.63
Positive relationship, interaction, and support from former students, mentors, advisors and staff	9.14
No financial problems	9.14
Graduated from a good high school and got a solid foundation for college study	9.56
No break-ups, personal or family problems	10.21
Family members have no illness or health problems	10.33
Have no chronic diseases or disabilities (i.e., depression, alcoholism, drug addiction, migraine headaches)	10.51
Good part-time job with flexible work schedule	11.23
No peer pressure for drugs or alcohol	11.37
Have a reliable vehicle (no car breakdowns or traffic accidents)	11.60
No involvement in legal cases	11.67
Course (Subject/Content)	
Clear course structure, informative syllabus, detailed schedule of exams and assignments	2.42
Clear and fair grading policy	4.40
Availability of study guide	5.26
Reasonable expectation and level of difficulty	5.53
Reasonable number of exams and exams related to material covered with various types of exam questions (multiple choice, short answer, essay)	5.63
Good textbook	6.09

Assignments in addition to exams	6.60
Availability of lecture PowerPoint slides	6.88
Extra credit opportunities	7.14
Integration of course with other courses(i.e., courses complement or extended other courses, materials in a course can be related to those of others courses)	7.86
Course requires group discussions and group projects	8.26
Professor (Institutional Agent)	
Instructor has a good personality, respects and motivates students, and is willing to help	1.91
Instructor delivers interesting, informative, and well-prepared lectures	2.16
Instructor speaks English well and has no language barrier in communicating with students	2.49
Instructor has a PhD degree	3.58
College (Institutional)	
Location of the college, type of town and community, availability of local part-time jobs	5.23
Accreditation and reputation of programs	5.37
Variety of majors to choose from	5.84
Courses offered every semester with multiple sessions to choose from	6.42
Quality and availability of computer labs, wired and wireless networks, computing equipment, library and library book collection on campus	7.23
Availability of scholarships and financial aid	7.28
Academic and career advising	8.05
Environment provided through classrooms, campus buildings, and campus design	9.91
Availability of tutors	10.72
Presence of international students on campus	10.91
Availability of online courses as well as offline courses	11.05
Campus cultural events, speakers, shows, art exhibitions	11.16
School provided means of transportation and parking facilities	11.21
Availability of study abroad programs and international exchange programs	11.42
School managed dormitories, their locations and environments	11.60
Quality of health clinic and health insurance	12.21
Quality and availability of RAC facilities	12.84
School athletic programs and sports teams	12.88

Social	
Economic condition of the United States	2.47
Trends of society and technology	3.07
Crime rate in the community	3.67
World peace, no wars and conflicts outside the United States	4.16
Content and quality of national TV programs, movies, and news media	4.84
Role models in the society	4.88
Republican or Democrat Federal Government	5.02

Discussion of Findings

Based on the rankings in Table 6, the most important personal internal factors are related to motivation, commitment, participation, and studying while the most important external factors are support of family and friends. The highest ranked social factor is the U.S. economy, which may be related to the current poor economic conditions in the U.S. The most important institutional factor is the location of the university, availability of jobs, and type of community or town. This last factor may be partially be explained by the location of the respondents, a small, rural town in the southeastern U.S. where the job market is poor. There are also several highly ranked factors related to the professor and to the course.

A closer examination of the results and in depth discussion is provided below. The key findings are discussed, related to previous research, and used to identify future research issues. These key findings are discussed in light of the students' internal locus of control, students' motivation and emotional IQ, team work, quality of teaching, and specific aspects of the university budget.

Difference between Factors Identified by Students and Literature

The most notable difference between factors identified by students and those discussed in the literature is the fact that students did not mention intelligence in Survey 1. One explanation is that the students consider intelligence as a default factor and saw no need to mention it. The alternative explanation is that the students do not consider intelligence important. A study by Goleman (1995) is in agreement with the alternative explanation suggesting that IQ alone is not sufficient for measuring success; it only counts for 20%, and the rest is explained by emotional and social intelligence and luck.

Overall, the factors listed by students were discussed in the literature, but the factors found in the literature were typically at a different level of granularity. For example, effort was a factor examined in many studies. However, students did not list effort, but instead listed activities that required effort like studying, attending class, reading, taking good notes, and doing homework. There was one factor that was not explicitly listed in the literature and that was that a review for the exam was provided.

There are several factors examined in the literature that students did not list. These factors relate more to policy (on retention, suspension, etc.), learning styles, and university and societal factors (i.e., the economy, campus climate, success of athletic programs, etc.).

Internal Locus of Control

Locus of control is a term from social psychology developed by Rotter (1954) that refers to the degree to which individuals think that they control events that affect them. Individuals with an

internal locus of control believe their own actions and behavior are the primary cause of events that happen to them. Many students cited events under their control more frequently in the first study (see Table 5) indicating an internal locus of control as it relates to academic success. In the first survey, where each student gave 10 factors related to academic success, the majority of the factors identified by students are factors within their control such as study, attend class, see professors, time management, and participate. Students only mentioned a few non-personal factors, such as availability of professors and friends' support in the group of most-often cited factors. In the second study, the item relating to an internal locus of control orientation are those that are labeled personal/internal/controllable in Table 6. The evidence from both surveys indicates that students have an internal locus of control orientation and believe that they have a direct impact on their learning and academic success through the time and effort they invest.

Motivation and Emotional IQ

In Survey 2 (ranking factors within each group), motivation was ranked as the most important factor in the group of Personal Traits and Characteristics. Intelligence and degree of motivation have been theoretically suggested as the most essential factors in academic achievement (Dweck, 1986; Harris, 1940) and experimentally verified by several studies, including a longitudinal study by Anderson and Keith (1997). Motivation is part of the larger concept of emotional intelligence.

Emotional intelligence is defined as the ability to understand, feel, manage, and guide one's own or others' emotions (Goleman, 1995). Emotional intelligence has been found to be associated with academic achievement, workplace performance, and business success (Cherniss & Goleman, 2001; Deniz, Tras, & Aydogan, 2009). Factors identified by students in the first study (Table 5) related to emotional intelligence are time/task management, commitment/dedication/hard work, don't procrastinate, be organized, self-motivation, and persistence. In the second study, factors related to emotional IQ are those that are labeled personal/internal/uncontrollable in Table 6. Based on the literature and our findings, emotional intelligence is a key to student perceptions about academic success.

Quality of Teaching

In ranking factors related to professors, students ranked "Instructor has a good personality, respects and motivates students, and is willing to help" and "Instructor delivers interesting, informative, and well-prepared lectures" as the two most important factors (Table 6) and had the least concern with the academic degree of their instructors. Personality, motivation, willingness to help, and delivering good lectures are factors that contribute to the overall quality of teaching, but are by no means the only factors that contribute to quality teaching. The importance of personality, motivation, and willingness to help confirms some of the findings of previous studies in which teacher quality and teacher experience have a positive relationship with student achievement (Greenwald et al., 1996; Hanushek, 1996).

In addition, in the first survey, "See professors" and "Good professors" were cited as the third and seventh most important factors out of 45 total factors identified by more than 5% of students surveyed (Table 5). In the Personal Environment category of the second survey, students ranked the importance of relationship in this order: friends, family members, faculty, classmates, roommates, and boyfriend/girlfriend (Table 6). This result indicated that relationship with faculty is more important to students than relationships with classmates, roommates, boyfriends or girlfriends with regards to perceptions about academic success.

Team Work

Students ranked the factors related to team work low. "Ability to communicate and interact within a group or a team" in Personal Traits or Characteristics was ranked 7th out of 7. "Use study groups" in Personal Behaviors was ranked 14th out of 20. "Course requires group discussions and group projects" in Course was ranked 11th out of 11. Although many IT-related courses are designed with group projects or team work, students do not believe that the group projects help academic success. This result is not consistent with evidence reported in the literature. Team-based learning is advocated by many educators and has successfully been put into practice by Michaelsen, Knight, and Fink (2002) in a traditional environment and by Gomez, Wu, and Passerini (2010) in a computer-aided environment.

Recommendations

As stated in the introduction, enrollments in IT-related degree programs are declining while demand for jobs in IT-related fields is projected to increase. Retention of students already enrolled in these degree programs is of the utmost importance. There are a few items highlighted in this study coupled with other research efforts that can be used in discussions about how to retain students in IT-related programs. The results of this research provide several insights based on student perceptions of factors relating to their academic success. The insights are discussed and recommendations are made at the institutional level and at the classroom and instructor level.

Recommendations for the Institution

There are several factors ranked highly by students related to the professor and to the course. This indicates that students believe that the quality of instruction is vital to academic success. Fortunately, factors related to instructional quality are under the control of the instructor and the university. If universities value high quality instruction, they should continue to invest in the professional development of their educators. In order to attract and retain high quality educators, institutions must determine how to measure teaching quality, how to reward high quality teaching, and how to balance teaching and research.

To measure teaching in higher education, the student evaluation of faculty (SEF) is commonly used to assess quality of teaching. However, empirical studies have found a positive correlation between a student's expected grade and the resulting SEF (Zangenehzadeh, 1988). Using SEF for faculty salary, promotion, and tenure decisions pressures faculty to comply with student demands regarding teaching style and grading. Weller (1984) reported that using SEF was one of the two main reasons for grade inflation. Haskell (1998) went on and suggested that using SEF infringes academic freedom and the quality of instruction. Does SEF measure student academic success and improve quality of education? Perhaps a more direct measurement of student achievement should be used in addition to SEF.

Research is the core mission of many universities as it is a strategy for funding higher education. Therefore, research is a factor for evaluating and compensating faculty (Sutton & Bergerson, 2001). Faculty salary increases and promotion decisions are typically based on research, teaching, and service. Studies show that faculty research productivity is strongly correlated with salary, and teaching at the graduate level is positively correlated with salary, whereas teaching at the undergraduate level is negatively correlated (Massy & Wilger, 1995). Some research universities have been criticized for not paying adequate attention to undergraduate teaching (Bok, 1992). As the quality of teaching and structure of the course is important to students with regards to academic success, a way of balancing the reward for good teaching with that of good research needs to be addressed at the institutional level.

Recommendations for Faculty

There are several factors cited as important by students and in the literature, such as quality of instructor, locus of control, team work, relationship between faculty and students, and emotional intelligence, on which faculty have some control through professional development, classroom design, and curriculum development.

According this study, faculty who are well prepared, willing to help, motivating, interesting, and informative contribute highly to student perceptions of academic success. In addition, faculty who design courses with clear structure and lay out syllabi clearly also contribute to students' perceptions of academic success. It could be argued that faculty who are interesting, motivating, and informative can potentially enhance their students' personal motivation/initiative and commitment/dedication, which are cited as important by students. It is important that faculty continue to improve teaching methods and course design as both make a difference in the perceptions of academic success for students.

The result of these two surveys reconfirmed the findings in previous studies of the importance of emotional intelligence. Therefore, faculty should be concerned about emotional intelligence as well as technical intelligence and incorporate both emotional intelligence and technical intelligence in curriculum development and in program assessment criteria.

In the second survey, faculty are perceived as more important in contributing to academic success than classmates, roommates, boyfriends, or girlfriends (see Table 6). At the same time, the survey indicates that students have an internal locus of control orientation and believe that they have a direct impact on their learning and academic success. This potentially puts more demand on faculty to manage and motivate students without violating students' internal locus of control and creating resistance to authority. Emerson (1962) gave some suggestions to handle the power-dependence relationships between faculty and students. To apply Emerson's suggestions in an academic context, faculty should:

- Clearly define rules and requirements ensuring that they are easily enforceable by the instructor and easily followed by students.

- Have clearly defined policies for dealing with students who reject the rules and requirements or who fail to participate,

- Provide incentives for student conformance to the rules.

- Provide incentives for forming positive coalitions or study groups as peer pressure is potentially more powerful than the power of instructor alone.

- Recognize differences and handle students differently since students with a predominately external locus of control orientation are likely to accept external manipulation and conform to imposed norms and expectations while students with an internal locus of control orientation are more conducive to high achievement and independent functioning, but resist submitting to authority (Spector, 1983).

The fact that students do not see team work as important to their academic success, as indicated by their low ranking of team work in the second survey (see Table 6), is troubling. The ability to work in teams is imperative, especially in the IT industry. In a study by Aasheim, Williams and Butler (2009), IT managers ranked the ability to work in teams 3rd overall in a list of 32 skills and traits of important for entry-level IT workers while communication skills were ranked 2nd and interpersonal skills in general were the highest ranking category. The disconnect between student perceptions and the actual importance of working in teams is not necessarily a function of the amount of team work required in IT-related degrees, but perhaps more a function of the quality and scope of team-based projects. Perhaps students do not see projects of sufficient scope or

depth to recognize the value of team work. In addition, as educators, we may wait until too late in students' academic careers to involve them in team based exercises. In this study, students frequently cite getting to know faculty, meeting friends, and support from friends, family and faculty as important. Therefore, importance of social interaction is important to students participating in this survey in IT-related degree programs. Social activities will provide students with the opportunity to meet professors and feel comfortable approaching them and to meet other students and establish partnerships, friendships, and perhaps teammates.

Conclusion, Limitations, and Future Research

The goals of this research project were to (1) unify the existing research in to a cohesive, comprehensive framework, (2) to add the voice of the student to the factors that had been hypothesized and confirmed in prior research, (3) to incorporate the factors identified by students in to the framework that was proposed, and (4) to have students rank the factors as they related to academic success. These goals were accomplished by first administering an open-ended survey to students asking them what was important to their academic success or failure. The most often cited factors by students were then combined with the factors identified in prior research and all factors were categorized using a subset of the newly proposed framework. Students were then asked to rank each factor within each category.

The results of the ranking provided confirmation that certain factors related to the professor are consistently cited as the most important when related to academic success. Students value instructors that are interesting, well prepared, and informative as well as those that have a clear course structure. The findings in this study indicate that:

- Generally students have an internal locus of control when it comes to academic success.

- Motivation and emotional intelligence are factors that students consider important to academic success.

- The faculty member teaching the course is an important factor in the student's academic success.

- Students did not seem to think working in teams as greatly contributing to their academic success.

Further research is needed to verify the proposed generalized framework, such as confirmatory factor analysis. In order to compare across the proposed groupings of factors, a study where students provide an overall ranking of several of the top factors of each group is needed. The survey needs to be administered to non-IT students to see if there are differences between IT students and non- IT students. As the instructor plays an important role in student success according the students' perceptions and the literature reviewed, a future study on the importance of instructor involvement with students in the classroom and outside the classroom as well as indicators of qualities of instructors that are successful in the classroom (such as teaching style, involvement in research, and personality characteristics) would be beneficial.

The limitations of this research include that students surveyed were from a single university, all students were enrolled in courses in IT-related degree programs, and the sample size for the second survey was relatively small. A broader study would need to be conducted to see if the results do indeed generalize when including a larger sample of students from more universities.

Another limitation is that, in the study, academic success is not defined for students. Therefore, different students may have different definitions of academic success. A student might define success differently than a faculty member or an administrator. Academic success indicators include, but are not limited to, graduation rate, retention rate, annual salary the first year after grad-

uation, and placement percentage. Depending on how success is defined, the factors that are important to success could vary.

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