CONFERENCE PROGRAM

40 YEARS OF EXCELLENCE and beyond

November 9 – 12, 2013

Newport Marriott, Newport, Rhode Island

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NEAIR Friends and Colleagues:

The 40th annual conference of the North East Association for Institutional Research was celebrated November 9-12, 2013 at the Newport Marriott in the nautical setting of Newport, Rhode Island. While these *Proceedings* include the majority of intellectual content shared at the meeting, they cannot capture the spirit of camaraderie, support, professional commitment, and unity that permeated the conference. Our conference attendance of 438 ranked the highest ever. It is clear to me that NEAIR is a valuable organization of its members. This conference provided professional development, networking and a forum to discuss the aspects of institutional research. It enabled our members to strengthen their past and current knowledge as we proceed into the future.

NEAIR's long-standing policy of entrusting the conference planning and execution to a program chair and local arrangements chair succeeded in offering a superb conference for all attendees. As program chair, **Alan Sturtz** reached for the gold and compiled a stimulating and rounded set of plenary speakers and other presenters. Deborah Santiago instilled us with great enthusiasm in her opening plenary discussion on the changing demographic landscape of higher education. Dr. Patrick Terenzini engaged us in exploring change and stability in institutional research with lessons learned from a life-time of experience and a look ahead at what the future may hold in the profession. The panel of knowledgeable NEAIR members shared personal experiences in work-life balance. In addition to our three plenary sessions, our program consisted of 17 preconference workshops, 9 contributed papers, 39 workshares, 11 techshares, table topics, special interest groups, and 9 vendor showcases.

As Local Arrangements Chair, **Carl Ostermann** collaboratively coordinated a committee dedicated to dazzle us with the various restaurants and entertainment within the Newport area and an opportunity to experience WaterFire in Providence. We feasted on lobster, danced, enjoyed numerous karaoke singers and listened to some well-known tunes with the lyrics adjusted to represent our IR experiences. We met new friends and colleagues throughout the conference and reenergized ourselves with a walk or run on the spectacular Cliffwalk. I think I can rightfully boast and say that the Newport conference was one of the best on record.

I am ultimately thankful for the members of the Steering Committee and Beth Simpson for keeping me on track during this past year. I am grateful of each member's suggestions and comments on the policies we discussed throughout the year. They provided wisdom and professionalism allowing us to engage in frank and open discussions that will ultimately benefit the association's future.

Finally, my gratitude goes to **Tiffany Parker**, our Publications Chair, who spent many hours preparing this document. Her work in collecting, editing, and producing the *Proceedings* in electronic form, is greatly appreciated. Her work has helped us preserve a piece of intellectual history that will be read by many in the years to come.

Catherine Alvord
NEAIR President 2012-13

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Alexander Yin, Peer Review Coordinator

ACKNOWLEDGEMENT

Contained in these pages are the Proceedings of the NEAIR 40th Annual Conference provide 9 contributed conference papers/presentations authored by 13 NEAIR colleagues.

Additional conference presentations are just a few clicks away – accessible within in the NEAIR website under the Annual Proceedings section. These pages are only accessible to signed in NEAIR members.

Special thanks go out to Cathy Alvord, Alan Sturtz, and Beth Simpson for their contributions, oversight, and support with all aspects of publications responsibilities during the course of this past year.

Tiffany Parker

2013-2014 NEAIR Publications Chair

Mt. Wachusett Community College

Table of Contents

** Indicates Best Paper Award
* Indicates Best First Paper Award
◊ Indicates Best IR/Practitioner Paper Award

Aspiring to the role of *Data Badass*: Some thoughts on the political context of IR

The genesis of this paper was a grant proposal – sadly, a failed one – to the Spencer Foundation a few years ago in a program they use to have called "Data Use and Educational Effectiveness" or some such thing. The grant program gave small grants to educational researchers seeking to better understand the organizational factors that determine whether good educational research and data are actually used in decision-making contexts. My basic research design was to conduct a survey of all of you – IR professionals – about specific instances where data was used, and where it was not.

Because perhaps no one in higher education is better positioned than the IR professional to understand this basic fact about human nature: people believe things that are not true. Who knew? Specifically, people believe things that tend to serve their self-interest – if reality and self-interest collide, empirical reality tends to be on the losing end. This is pretty much the core truth of my entire training in the discipline of psychology. The study I proposed was, in essence, an effort to understand the contextual and organizational factors that reinforce this unfortunate facet of human nature, and make our own work as institutional researchers / truth-tellers that much more difficult.

Rejected grant proposals aside, I'm not sure anymore that this is the most fruitful line of attack. I doubt that it will ever be possible to define the "ideally" receptive organizational context to the kind of work we do. Even if we could, do we have the line authority to create and maintain such a context or process? Put another way, do we really want to play the role of umpire or referee if we're not really sure everyone is ultimately going to play by the rules? And, is this really the role our senior leadership wants us to play? Umpire? Referee? I used to think that, but

when, after data presentations in which I have carefully maintained my objectivity, I am increasingly asked for my "point of view" or "what I think", it feels like I'm being asked to drop the referee's uniform, get off the sidelines, and get on the field of play.

This is a new role, and it isn't the one I got into the field of IR intending to play. Nor, I suspect, did you. If we are not disinterested, objective "researchers", but instead find ourselves being asked to close the laptop, turn off the Power Point, and pull up a seat at the table to engage politically with a "point of view", what stance should we adopt in this unfamiliar role? This paper is a preliminary attempt to flesh out some answers to that question.

First, for those of you who don't know me personally, a little personal history is in order. I began my career in IR as a painfully naïve ex-professor of social psychology, who genuinely believed that the sole impediments to having data directly inform decisions were methodological or analytic in nature. That's not just rhetoric – I genuinely did believe this – that the institution that hired me was like parched earth on which the flow of data and analysis from my newly created office would be a source of sweet water. That the only limitation to the impact I would have would be my own skill at divining, and then communicating, "what the data say."

It has taken me the last 11½ years to learn that this is not, in fact, true. For institutional researchers, this is not cynicism, but realism. I have had to learn and re-learn this basic reality of institutional research the hard way, sometimes embarrassingly, usually in public, with my patient employers and indeed with many of you, as my indulgent tutors.

But I do take these issues of defining our profession very seriously. To hear my wife tell it, perhaps a bit *too* seriously – though many of the themes of the recent IR literature reassure me that I am far from alone in perseverating about just what it is we should be doing in this day and age as institutional researchers. For verily, I say unto you that the path of the righteous

institutional researcher is beset on all sides by the tyranny of rapid changes in technology, globalization, data proliferation, not to mention the ongoing restructuring of higher education itself.

For all the talk of "data-driven" decision-making on our campuses and of institutional research being a perennial growth area within them, with expanding areas of responsibility and resources to match, my own unfailingly pessimistic sensibility directs me to consider another possibility. Is it not just as likely that this burgeoning demand for the kinds of services that are currently aggregated in our offices may lead to the centralized, "full-service" IR office ceasing to exist in recognizable form by, say, the year 2030?

Well, now that's a downer. But hear me out, I ultimately have a positive message here. Some of you will recall the example from Clayton Christenson's oft-cited paper *Disrupting College* of how the multi-service firm IBM, just when demand for personal and business computing was fully maturing, when it had reached the height of its market dominance, was picked apart with astonishing speed by competitors specializing in single areas of its full-service model. These more narrowly specialized competitors were able to offer products and services at higher quality and lower cost. I think we should be haunted by this analogy, on behalf of our "full-service" institutions as Christensen intended but also, closer to home, because the analogy fits all too well when applied to the centralized IR professional and the role of his or her office. We are the prototypical "Jack (or Jane) of all trades, master of none." Or, as I learned from my daughter's "365 new words a year" calendar entry, the prototypical "factotum." A factotum, you will be interested to learn if you don't already know, is defined as "an employee with a diverse range of capabilities and responsibilities. A general servant."

At any rate, might the burgeoning demand for "data-driven decision-making", rather than expanding and raising the profile of our roles in their current, familiar form, instead mean fewer *factotums* and more specialists, as other functional areas within our organizations professionalize or as outside consultants begin performing parts of the IR function more efficiently? If I'm right about the IR role going the way of IBM – that *functions* performed by the IR office will continue to grow in importance, but that they are unlikely to be performed by a single, centralized IR office – then several important things follow.

Most broadly, it means that efforts to define the proper role of our profession – such as this one – are not mere narcissistic, self-referential navel-gazing, but are…well…*kinda important*. How institutional research offices answer questions such as: *What is the core role that cannot be "outsourced" to other functional areas? Which functions can be "let go" without compromising that core? How do we collaborate without making ourselves redundant?* will determine what we spend our time doing in the coming years, or indeed whether we are there to do it at all in our current role. Practically speaking, I think it may mean that we will need to specialize – to get better at one important thing, even if it means getting less good at a wide range of things. Less *factotum*, more specialization.

The good news, I think, is that for the most part our institutions recognize the ungainly nature of our roles and responsibilities (a recognition manifested in the run-on titles they've given our office, among other things, current company included) – and as a result WANT us to do this – that is, to help them to think critically about how we can best serve the broader goal of helping our institutions become more data-driven. Because, let's face it, whatever the nature of our responsibilities as IR offices <u>today</u>, the creation myth for most of our offices does not feature

a wise senior leadership thoughtfully debating how best to align their decision-making and resource allocation more closely, using data.

In fact, the prime mover in the *actual* creation myth for most of our offices, though shrouded in mist, bears the initials are I.P.E.D.S. and U.S. News. That is: compliance reporting. Sure, our functions have matured since then, but rare is the institution that can truly say it has thoughtfully considered how best to position its IR office so as to become a maximally data-driven organization. But I think the time is ripe – our senior leadership wants to have this conversation, and wants us to participate in, if not lead it.

While there is always an element of naked self-interest in this kind of active role negotiation, I reject any suggestion that it is in any way opposed to the best interests of our organizations. A silver lining, here: perhaps we are *lucky* to be living in a time and working in a profession when our own naked professional self-interest and the interests of our institutions are truly aligned to an unusual extent. This will not always be the case, but in the medium-term this period when the meaning of "data-driven decision-making" and of the role of IR with respect to it are still very much in flux, I think we are most helpful to our institutions when we actively advocate for the role that we think best serves that purpose.

OK – so 12 minutes in, I finally arrive at the thesis statement of my little talk. It concerns the role that I think best describes the function in which our "multi-service" offices should begin to specialize. Now, I went back and forth on this several times, and can't help but feel I'm going to regret it, but I simply cannot think of a better alternative term for the function or role I have in mind for us: that of *data bad-ass*.

[slide]

Those of you working for institutions with a religious mission may prefer the term *data champion* or *data advocate,* or even *change agent,* all of which adequately capture the gist of what I'm trying to express here. But not quite: my own carefully considered first preference remains *data bad-ass.*

Just so you appreciate how hard I tried to come up with an alternative to this very un-professional term, I want you to know I actually googled the phrase "bad-ass synonym" repeatedly, over several days, while I was preparing this talk. But I kept finding thesaurus entries a poor substitute. What finally nailed it for me, was this definition from the unauthorized online *Urban Dictionary* (modified somewhat for family audiences):

> Bad-ass: *One with very large ego, which allows them to be direct and efficient in all they do. An indifference to the standards of others, but with a personal moral code…one who disregards power in numbers and will confront multiple opponents who defile this personal moral code. They are often quiet, but can be outspoken. When they do speak, what they say is direct, wise, and simple.*

Unfortunately the popular definition of "bad-ass" is a bit more of a troublemaker than I have in mind. More Henry Fonda from *12 Angry Men* and less *Thelma and Louise*.

[slide]

So I'll be more explicit that the recipe for the self-concept that I have in mind is about one-third nonconformist / troublemaker, about one-third directness and a "willingness to share unpleasant facts when necessary", and about one-third "formidable skill." And I'll grant that for all of these

a “very large ego” or at least a very thick skin is a prerequisite. This is the role that I think we as IR professionals should cultivate and enact.

At this point the obvious and uncomfortable question presents itself – does this number cruncher at the microphone, with his “very large ego” and apparent delusions of grandeur actually conceive of himself this way? As a kind of Samuel L. Jackson with a pocket protector? Let me relieve your concern by saying that by no means do I consider myself a fully mature specimen – hence the “aspiring” in the title of this talk. But when I look back on the moments in my career in which I think have had the greatest positive impact on my institutions, they occurred when I made at least gestures toward the high standards of this role: when I had to argue for an unpopular point of view; was able to effectively communicate unpleasant, as opposed to pleasant, facts; and was most able to demonstrate notable, if perhaps not “formidable”, analytic *as well as interpersonal* skill. I want to take the rest of my time up here to share some examples that flesh out what I am talking about.

The first example is where my latent *inner bad-ass* was roused into action first by an opportunity to exercise a *compulsive* urge that I am sure is a familiar one for many of you – to *debunk “accepted wisdom”*. Now, nobody likes lazy thinking and untested, sweeping assertions, but I use term *compulsive* here to denote something more – a kind of psychological ‘fit’, sudden in onset and which does not subside until one has rushed back to one’s office, spent the next three hours compiling data and doing nothing else until an airtight, compelling analysis debunking said accepted wisdom has been prepared and written up.

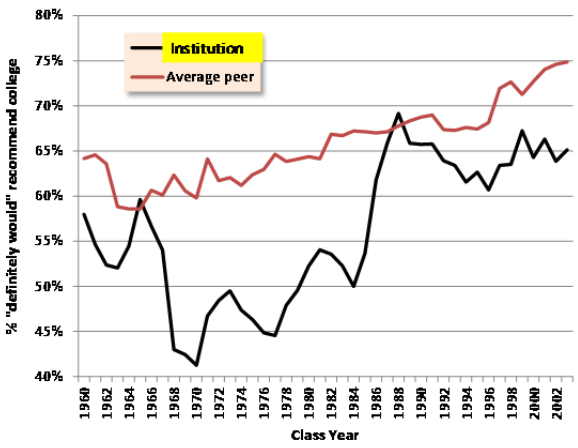
Now, I know what you are probably thinking: “Wow, that’s really great, Mark, so you actually believe one of our most important functions is not to increase institutional knowledge, but to actually undermine, debunk, or otherwise *reduce* it? Really?” To that unasked question, I

answer a cheerful and unabashed, "yes." When debunking is done with a sense of humility and a keen awareness of the fact in the end we *are* "just the data analysts", not the ones bearing direct responsibility for important bottom-line results, I think this *is* one of the most important ways we can add value, undermine *groupthink*, and at least delay misguided and costly decisions. Enacting this role of "non-conformist debunker" – again, with respect and humility – also serves to highlight to the senior leadership *as a whole* the importance of our office's independence and objectivity from any one functional area. A de-centralized function, in contrast, with "mini-IR shops" in each administrative area, is less likely to surface "debunking" data or any indeed any information that conflicts with the status quo, whether in theASir own area, where it may be perceived as defending (or undermining) one's boss, or in someone else's, where it may be perceived as partisan or illegitimate (i.e., who asked you, anyway?).

At any rate, I think this "compulsion to debunk" – and the first *bad-ass* trait of non-conformity and independence – is illustrated by my first data example. Going into the a 2009 Alumni survey, accepted wisdom in our Development Office was that the class years of the 70s and early 80s represented a "lost decade" as far as fundraising. Fewer and less frequent gifts and lower reunion attendance were indeed the norm for these cohorts. Our Chief Development Officer, though only just having arrived at our institution, "knew" this was a history effect – specifically the result of shifting cultural norms about identification with "institutions" generally during the tumultuous historical period when these alumnae/I attended our institution. Sure enough, our alumnae survey data show a sharp drop-off in "willingness to recommend" – and in alumni giving to – our institution for these class years.

But somewhere around the fifth or sixth time I heard it said that "we know" that the dropoff was due to broader forces at work in our larger culture, and had nothing to do with our

institution *per se* at that time, my thoughts became disoriented, my face grew hot, and I knew that my *compulsion to debunk* had kicked into high gear. Rushing back to my office, I was able to produce this chart, which I shared, offline, with our CDO.



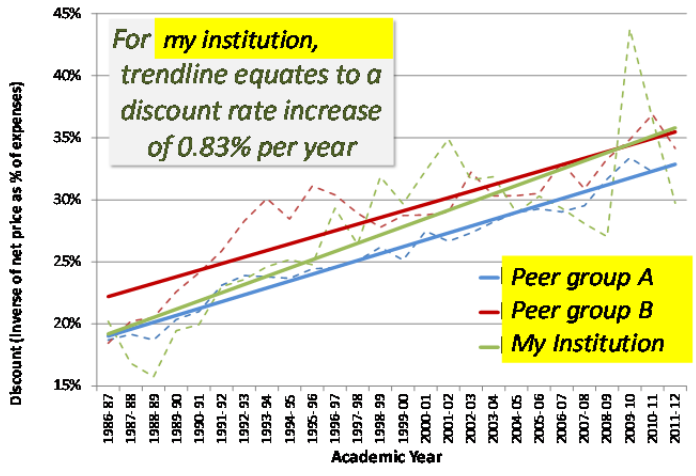
Since that time, I have not heard that piece of accepted wisdom put forward as anything but one of several "possible" explanations, one of many others than were now focused on the specific history of our institution during that time. This new understanding was critical as we afterwards entered a fundraising campaign with messaging targeted differently by graduating cohorts.

There were several theories about "why" this pattern was the case, but that's not important here. Instead, let's examine how this overall reorientation happened. Doing the "debunking" offline, with humility and in what I think of as the "spirit of co-discovery," was a key element – I've learned after numerous missteps that the "spirit of co-discovery" is easier to embody in a one-on-one, offline conversation than in a public criticism or reaction. But that *compulsion* to get the interpretation right – or at least to avoid getting it wrong – is one that I think only an independent, centralized IR person would have enough of a stake in to want to go to the bother of gathering, compiling, and – unsolicited – writing up the relevant data.

My second example – don't worry, I only have three – also highlights how enacting the trait of independence and "indifference to the standards of others" as a kind of disinterested third-party is something that I think *only* a centralized, IR office can convincingly do. The setting here is the college's discount rate.

Our institution's own discount rate had increased sharply during the economic downturn as our yield modeling – performed by an outside consultant, *not* yours truly, thank God – did not properly adjust for the impact of the economic downturn. This understandably greatly alarmed our Chief Finance Officer – by definition, discount rates increases cannot go on forever. The downturn led to a fair amount of tussling between our CFO and Chief Enrollment Officer over what discount rates should be assumed for the five-year budget model.

The CFO wanted to hold the line, and thus to assume a gradual recovery to "historical norms" and then no increases in the out years. Meanwhile, our Chief Enrollment Officer knew that was probably unachievable during this national period of increasing tuition and flat incomes, and wanted a cushion – or at least a tacit understanding – in the form of an assumption of increasing discount rates going forward. The latter was the one who approached me to see whether there was not a way of empirically demonstrating her gut sense that holding the discount rate flat over the next five year period would be impossible.



After a lot of thrashing around in the dark with national data on family incomes, inflation, unemployment, projections for high school graduates, trying to develop something that could reliably project discount rate or net price based on these national-level variables, I ended up throwing up my hands and put forward a very simple historical trend line display. Not formidable skill, by any means, but probably the best assumption.

But, because the result pleased neither of them completely, it is something that no one but an independent, objective analyst would put forward. Again, this rate of increase pleased neither the CFO nor our Chief Enrollment Officer, but produced a kind of fruitful détente. An annual increase of less than one percent was better than nothing, but it was *not* something that was going to give our Chief Enrollment Officer any kind of meaningful cushion as she tried to craft next year's entering class. Meanwhile, from the CFO's budget modeling perspective, the increases did not impact the budget adversely in the short term – providing some relief in the short term as compared to a more inflationary assumption for discount rate – but *any* assumption of increasing discount rate eventually wreaked havoc with the budget model in the out years. Yet the number itself was unassailable. For either person to argue with it would mean arguing not only with 25 years of our *own* history, but with 25 years of history for *our entire sector of the higher education industry*.

The important result of this effort was to better align the budget model assumptions with reality, to take the guesswork and politics out of this number. A more significant positive result was to broaden the terms of this narrow, essentially interpersonal debate to a larger and more inclusive discussion about sustainability. This was not rocket science –the data on net price are readily available. But having an independent, objective – and assertive – voice in the conversation was, I think, essential to this result. Yes, a voice that knows how to find the relevant data and analyze in the right way, but more importantly one who simultaneously has no direct stake in the data *yet understands thoroughly the strategic implications of this number*. Without that "high-stakes" independence, a central element of this *data bad-ass* role of IR for which I'm advocating, this result would not have been possible.

The last example I'd like to share has elements of all three traits, but is mainly an example of "being willing to share unpleasant information when necessary." I'm closing with this example because this is the trait of a *data bad-ass* about which I have the most reservations. Yes, the trait of independence and objectivity cuts both ways, but it seems core to our identity, even when it means disagreeing; and the trait of having "formidable skill" is something none of us could do without. But what about this trait of "willingness to share unpleasant information"? Doesn't this fly in the face of the human tendency to "kill the messenger" of bad news? Shouldn't we be seeking opportunities to emphasize institutional strengths, not harping on institutional weaknesses? Thinking solely from the perspective of our own professional self-interest, shouldn't we at least try to maintain a ratio of 50% of the time being cheerleaders instead of naysayers?

One of the many disconnected fragments of wisdom I received from my father in my childhood relates to this question. My father was a mechanical engineer – he'd be so proud to be cited here; then again, maybe not – at any rate his advice was something to the effect of: "Organizations are full of critics, naysayers, and other malcontents who spend their time saying 'no' and trying to explain why something *can't* be done. The people who get promoted within the organization are the ones who know how to say 'yes' and actually go about delivering results." Sound advice – foolish to try to take that one head-on. So in working around it I'll have try to ambush it from the side.

Institutional researchers are not like engineers or other kinds of employees. Engineers are fault-finding machines – don't even get me started about how this affected my childhood – but ultimately they are *paid to build things that work*. All of that scrupulous attention to what's wrong with an evolving design is in the interest of this goal. Now, the fault-finding detail-

orientation is shared by of institutional researchers, but it isn't at all clear that our job responsibilities always extend to the next step of building things that *do* work. In some sense, then, maybe this wisdom about relative merits of a "can-do" versus a "can't do" orientation to one's effectiveness and professional advancement doesn't always apply to IR.

Now I'm not arguing that the trait of "being willing to share unpleasant information" implies that this is *all* one should do, but rather that it is something that our role, more than any other within our organizations, is optimally positioned to do. Trying to maintain even a 50/50 ratio of "can-do" to "can't-do" information might find us – as well our institutional leaders – ignoring a lot of mission-critical blinking yellow and red lights on our institutional dashboards. And while I don't expect my President, my Provost, or any other senior leaders to regularly come knocking on my door eagerly seeking my latest harvest of "unpleasant information", I do know that they do not keep me on the payroll for the purpose of sugarcoating or otherwise concealing unpleasant realities.

That said, this does present our profession with a real dilemma. Success has many fathers, while failure is an orphan – this is human nature – but since the role of adoptive parent often falls to IR, a focus on what is best for our institution puts us more often in the role of – at best – constructive critic than it does of team-playing cheerleader. This choice between honoring our obligation to our *institutions* by sharing information about things that are *not* working, or are *not* going well – and thus associating one's office with negativity or worse, with not being a "team player", is a difficult and dismayingly frequent one in my world, and I expect in yours as well. But since this is an unavoidable aspect of what we are indeed expected to do, we might as well embrace it. In fact we might as well seek opportunities to be explicit about it when we are playing this role, and about why it is necessary and valuable that we do so.

So this brings me to my final data example, an unpleasant fact about the overall extent to which alumnae/i at a former institution I worked at said they would recommend our institution to others. At this institution, the single greatest driver of "recommending" among all attitudinal items was satisfaction with social life. And that basic finding held true when analyzed from any number of analytic perspectives. But that's not the important thing here.

In fact the senior leadership was well aware that students never chose their institution for its fun-loving party atmosphere, active dating scene, or cuddly and caring faculty and senior administration. But it had operated more or less on the principle that that was OK – I think some may have even taken a secret pride in it and linked it to fundamental part of our culture, as a sort of minor side effect of our academic rigor. In any event no one seemed to think it *mattered* all that much to our reputation as a desirable place to learn and spend one's college years. The Alumnae/i survey analysis directly challenged this assumption and, for some, indirectly challenged the core of our institution's identity, because of two basic findings:

(1) The primary driver of alumni giving was "recommending"

(2) The primary driver of recommending was one's level of satisfaction with social life.

At least at this institution, this latter relationship was so robust that, in effect, asking a graduating senior or an alumna whether s/he would recommend their institution was, for all intents and purposes, *virtually the same thing* as asking them whether they had a satisfying social life while a student there.

There were happy stories in our alumnae/i data, of course, and in point of fact even this result was an "unpleasant fact" only as a matter of direction and not in degree – most alums *were* satisfied and giving rates were fine – but my willingness to highlight that essentially negative finding as the most important and "actionable" one turned out, to my surprise, to be critical. For,

as it turned out, despite the cultural veneer of relative indifference to students' social well-being – more colloquially, for their opportunities to have "fun", there was a revolution waiting to happen.

A coalition, if you will, of trustees, administrators, and faculty seemed to have been waiting for some kind of excuse or permission to facilitate student's efforts to lighten up a bit and have "fun" as well as scholarly rigor. This reaction was not immediate, nor was it uniform, but I think my willingness to continue to be direct about this "unpleasant" aspect of our alumnae/i data played at least a small role in several initiatives focused on improving student's social experience since that time. This was perhaps best exemplified by the inclusion of efforts to enhance the student experience as one of the four major, highest-level goals in this institution's strategic plan. I think I can say that without this data, that part of the strategic plan would be absent.

So what have I been up to here? Notably, this talk and my data examples have downplayed the technical role of IR in producing quality *data* and quality *analysis*, arguing instead that the important factors that determine whether data and analysis "have an impact" are for the most part interpersonal and contextual. And that, in fact, the major variable over which we have control – the role and communication style we adopt when we present the data – is perhaps the most important. That is not to say I don't think the actual data and presentation of it were irrelevant to that impact. Just having finished a do-it-yourself kitchen renovation, I am experiencing first-hand how much the capacity to "do it yourself" with any degree of quality depends on having adequate – if not formidable – skill, and on good tools. So, yes, data and analysis matter. But maybe they are not enough anymore.

I would argue that the most under-appreciated and underutilized resource of our profession is the collective wisdom of *data bad-asses* here in this room regarding the not-always-comfortable-to-talk-about interpersonal and contextual factors that finally determine how our data tools are actually used on our diverse campuses. That is the spirit in which I offer this talk and its proposal of the "data badass" role as my own small contribution to this collective wisdom. I hope you found something useful in it, in the data examples, but equally in the context surrounding them, and in what they suggest about the core attributes of an IR function that will remain valuable – and employed – in the years to come.

By way of ending, I want to leave you with one of my favorite jokes – which came to me again courtesy of my retired mechanical engineer father – that captures why I think we need to exert more of our collective energy toward the task of better defining the unique and non-outsource-able nature of our roles.

Here it is. So a homeowner has a clogged sink drain, and calls in a plumber. Clearly I still have kitchen renovation on the brain. Anyway, the plumber walks in, looks under the sink for a minute, heads down to the basement, feels around the drainpipe a bit, and then gives the drainpipe a gentle tap with his hammer. There's a small gurgle and then a sudden "whoosh" as the drain clears. The plumber turns to the homeowner and hands him an invoice on which is scrawled,

Repaired clogged drain: $100.

After picking his lower jaw back up off the floor, the homeowner says, "What?!? You've been here less than one minute and all you did was tap that drainpipe with your hammer! That's not worth charging me $100!" and hands the invoice back to the plumber in disgust. Plumber

pauses, scratches head. Crumples invoice and stuffs in pocket, writes a new one, hands it back to the homeowner. It reads:

Tapped hammer on drainpipe to repair clogged drain: 25 cents

Knowing where to tap: $99.75

Total: $100

So do our institutions view our offices as hammer tappers or as invaluable resources of practical knowledge, uniquely positioned to be able to identify and communicate the most actionable bits of insight to those who may not always want to listen, or who may have an active stake in *not* listening? The answer will of course depend on having access to good analytic tools -- on rich sources of information and on our skillful analyses of them. But it will depend just as much, if not more so, on how well we can tap into our inner *data bad-ass*, and effectively navigate the political context in which that data is used.

Relevant literature

Birnbaum, R. (1988). *How colleges work.* San Francisco: Jossey-Bass.

Borden, V. M. H. & Kezar, A. (2012). Institutional research and collaborative organizational learning. In R. Howard, W. Knight, & G. McLaughlin (eds.), *Handbook of Institutional Research*. San Francisco: Jossey Bass.

Chaffee, E. E. (1983). *Rational decision making in higher education*. Boulder, CO: National Center for Higher Education Management Systems.

Davenport, G. H., Harris, J. G., & Morison, R. (2010). *Analytics at work: Smarter decisions, better results.* Boston: Harvard Business Press.

Delaney, A. M. (2009). Institutional researchers' expanding roles: policy, planning, program evaluation, assessment, and new research methodologies. *New Directions for Institutional Research, 143,* 29-41. San Francisco: Jossey-Bass.

Gailey, S. C. (2008, April 1). Not getting any research from your office of institutional research? *Enrollment Manager, 4,* 1-5.

Knight, W. E. (2010). In their own words: Effectiveness in institutional research. *AIR Professional File, 115*.

Leimer, C. (2009). Taking a broader view: Using institutional research's natural qualities for transformation. *New Directions for Institutional Research, 143,* 85-93.

Swenk, J. (1999). Planning failures: Decision cultural clashes. *Review of Higher Education, 23 (1),* 1-21.

Terenzini, P. T. (1999). On the nature of institutional research and the knowledge and skills it requires. *New Directions for Institutional Research, 104,* 21-29. San Francisco: Jossey Bass.

Volkwein, J. F. (1999). The four faces of institutional research. *New Directions for Institutional Research,* 104, 9-19.

First NEAIR Paper

Title: Data-Driven Internal Benchmarks and Successful Learning Outcomes

Authors: Mamta Saxena and Douglas L. Flor from Northeastern University

Objectives: Use institutional data to augment student learning outcomes as part of the program assessment and refinement initiative.

Intended Outcomes for Attendees:

1. Assess the value of using Key Performance Indicators (KPIs) based on student success data (as defined by NEASC, S-Series data) for assessment and refinement purposes at the program level
2. Establish internal benchmarks for KPIs of student success
3. Derive and establish statistically valid signal values to inform programs of both quantitative and qualitative evaluation of KPIs for refinement of instructional practice at the program level
4. Report individual institutional programs comparisons with the internal benchmarks and specific signal values to: (a) track progressive refinement and, (b)augment student outcomes

Literature Review:

Six years ago, the Spelling Commission report (2006), "A Test of Leadership: Charting the Future of U.S. Higher Education," called attention to the fact that the quality of student learning in U.S. is inadequate and, in some cases deteriorating. One of the major criticisms was that higher education degrees are not well-aligned with the competencies that are expected of college graduates. Since then, there have been numerous debates on related issues in higher education such as persistence and student retention, poor alignment of degree programs with workforce requirements in the professional field, and the inadequate assessment of student competencies.

In a supplement document released after the State of the Union address on February 13, 2013, the Obama administration proposed the biggest change to federal higher education policy since the Higher Education Amendments of 1972. President Obama called for benchmarks to be set for affordability and *student outcomes* as criteria for receiving federal student financial aid. These benchmarks aim to reshape American higher education by modifying the accountability system in regard to cost, values, and *quality*. According to Ambrose (2010), "to develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned." Likewise, employer

surveys highlight the increased demand for a *quality* workforce for the 21rst century knowledge economy: college graduates with not only degrees reflecting meaningful learning, but also the ability to apply a variety of acquired interdisciplinary skills such as critical thinking, problem-solving, and the ability to learn on the job.

In the 1992 revision of the Standards for Accreditation and the implementation of the Policy Statement, NEASC defined *institutional effectiveness* as "the capacity of an institution to assess, verify, and enhance the fulfillment of its mission and purposes, giving primary focus to the attainment of its educational objectives." Assessment of student learning, according to the Policy Statement, is a key indicator of institutional effectiveness. The statement further affirmed that, “while assessment is an overall institutional concern, as reflected in the various standards for accreditation, its primary focus is the teaching-learning experience. To the greatest extent possible, therefore, the institution should describe explicit achievements expected of its students and adopt reliable procedures for assessing those achievements."

Besides accreditation, the changing landscape in higher education constitutes many challenges and opportunities for assessment practices including governance, financial aid, tenure, standardized testing, MOOCs, competency-base models, and the critical need for workforce alignment with college degrees, to name a few. Therefore, colleges and universities that grant degrees have the responsibility to assess and improve the *quality of student learning* and ensure that graduates acquire the required knowledge, skills, values, and attitudes toward the end of the degree program that will prepare them for work, life, and responsible citizenship. There is increased internal and external pressure for accountability in higher education in regard to student success and learning outcomes. How can institutions answer the call for accountability and fulfill the expected responsibilities?

The aforementioned question has a direct correlation with the framework used by higher education institutions to assess curriculum. More importantly, the issue at hand begs the question, how can institutions efficiently use the assessment data to inform refinement practices and improve student learning outcomes. Campbell (2007) quotes several statistics to make a case for current conditions in higher education still at risk (as stated 30 years ago in the “A Nation at Risk” report released by the U.S. Department of Education in 1983). He defers to academic analytics as “a new tool for the new era”, to respond to the accountability paradigm in higher education.

Although there is no magic formula for demonstrating institutional effectiveness or student learning, assessment efforts at College of Professional Studies must align with Northeastern University’s mission : “(a) to educate students for a life of fulfillment and accomplishment, and (b) to create and translate knowledge to meet global and societal needs.” Furthermore, assessment should not be looked at as a one-time activity to fulfill NEASC standards but an ongoing, integrative, and organic endeavor to help Northeastern University reach its maximum potential in achieving its mission. As mentioned earlier, one of the primary focal points outlined in the accreditation standards is the teaching-

learning experience. Assessment efforts should, therefore, be embedded as an integrated element of the learning experience and curriculum from start to finish and thereafter: a progressive refinement model, not just an "add-on" to the curriculum.

The "Principles of Good Practice for Assessing Student Learning" released by the American Association of Higher Education's Assessment Forum have matured overtime and have been used widely as an effective tool for educational improvement. These first principles emphasize the significance of a clear purpose, ongoing efforts for improvement, and the inclusion of multiple stakeholders in the policy and decision-making efforts. As we began to think about promoting a culture of assessment within CPS and working with other assessment and quality assurance teams at NU Online, we needed to adopt a collaborative approach to implementing the first principles into our assessment practices. The table below outlines the implications of these principles for the design practice.

Table 1: Implications of First Principles for Assessment

First Principles	Implications
Assessment should begin with the institution's vision of the types of learning most valued for students to achieve in the course of study	Define program competencies based on the institution vision, mission, and values
Assessment should reflect the multifaceted and enduring nature of learning as demonstrated via performance over-time: knowledge, abilities, attitudes, and habits	Define concrete outcomes and objectives at program, course, and module level
Assessment works well with clearly stated purposes	Map and sequence courses to program level outcomes and competencies: curricular mapping
Assessment requires attention to both outcomes and relevant experiences	Design appropriate assignments and activities for formative assessment and authentic, summative assessment at course level
Assessment leads to improvement when it involves participation from all stakeholders and representatives, asks questions that people care about, and embraced as a culture institution wide	Promote a culture of assessment by establishing a shared framework and communicating and aligning efforts across departments
Assessment is truly valuable when used as a medium to report accurate	Use the data collected from assessment to enhance design, facilitate faculty

information as part of accountability toward students and society for the sake of improvement	development, and improve student learning

Walvoord (2010) defines assessment as "the systematic collection of information about student learning, using the time, knowledge, expertise, and resources available, in order to inform decisions that affect student learning." (p. 2). The natural steps in assessment include:

1. **Goals:** What we want students to be able to do when they complete the degree?
2. **Information**: How well are students achieving the goals: the evidence of learning?
3. **Action:** How can we use the information to improve learning?
4. **Subsequent Analyses**: Assess whether the actions taken had the desired effect, thus "closing the loop"

The table below uses the aforementioned criteria defined by the four steps in the assessment process and the first principles mentioned earlier to craft the implications and areas of development for online assessment practices.

Table 2: Assessment Plan: Steps and Implications

Steps	Implications	Areas of Development
Goals definition: What are we measuring and against what?	If the purpose of assessment is to answer the question, "are students learning what we want them to?" we need to define the "what" in a concrete manner and ensure that the curriculum (outcomes and assessments) is well-aligned with the institution's mission and program outcomes (competencies).	• Establish a shared vocabulary for outcomes and objectives • Define concrete program and course outcomes • Define tools for curriculum mapping- two dimensional matrix of courses (outcomes and assessment) against competencies • Establish a framework for course level definition of competencies: Rubrics and Assignment templates
Information collection: What is the evidence or measure of learning and how are we documenting/recording	Before we collect data we need to define the curricular sequence in an intentional and cumulative fashion so we can define the sequence of competencies to be mastered and assignments to do at the program and course level. We need to document learning via individual data	• Complete curriculum mapping at program and course level by locating signature assignments/assessment items across the program • Create course maps, rubrics, and assignment templates at course level to answer the student's question:

that data?	collection at program and course level.	Why do I have to take this course and how is the assignment aligned with the outcomes and competencies in the degree program? • Create systems/dashboards to document/record student performance against competencies and outcomes: Which competency is mastered at what level, what point in time, demonstrated by what kind of assessment?
Action: How can we use the information for progressive refinement in design?	Some of the drawbacks of assessment include focusing on compliance with standards, gathering data that is not used for decision-making, and making the process too complex. When done right, assessment leads to actions such as changes in programmatic structures, requirements, policies, funding, planning, faculty development, enhanced design, and ultimately, improved student learning. Hence, we need to document learning not only via individual data collection at program and course level, but also by defining and creating systems for feeding that data into decision-making. We can, however, build on what we already have as evidence of learning and keep it simple!	• Create systems and processes for analyzing data to create internal and external benchmarks • Create systems and processes for feeding the analysis results and benchmarks into design decisions (act upon the data) • Create systems and processes for tracking the results of the actions

Methodology and Data Sources:

As a means of evaluating indirect measures of program level student learning outcomes as per NEASC (see Student Success or S-series data reporting), student data across the years 2008 to 2013 for the College of Professional Studies students was pulled from Banner relating to Graduation and Persistence rates, as well as Course Completion rates. Data were analyzed separately for the two levels of students - undergraduate students (n=3379) and graduate students (n=3305). Data were then analyzed via the establishment of internal benchmarks for these three Key Performance Indicators (KPIs) at each level of student. In addition, specific signal values were set which allowed each program to be compared and evaluated with respect to the students within their respective program level.

Using the mean and standard deviation over a three year period, signal values establish four separate groups for the KPIs associated with Graduation and Persistence rates as internal benchmarks. Those programs with values below the mean-minus-one standard deviation were

classified as Red, *Well-Below Average*. Programs with values from the mean-minus-one standard deviation to the mean were classified as Yellow, *Below Average*. Programs with values at, or greater to the mean and yet less than the mean-plus-one standard deviation were classified as Green, *Above Average*. Those programs with values at or greater than the mean-plus-one standard deviation were classified as Blue, *Well-Above Average*.

Programs in which Graduation and Persistence Rates were clearly classified as trending to the classification of Blue (Well-Above Average) or maintained a classification of Blue for more than one year were identified. Programs that were clearly classified as trending to the classification of Red (Well-Below Average) or maintained a classification of Red for more than one year were also identified.

For Course Completions (Withdrawals, Failures, and Incompletes), five separate sets of signal values were developed. If a student successfully completed 100% of their courses for a given year, student data were categorized as Blue. If a student did not successfully complete 1% to 20% of their courses for a given year, student data were categorized as Green. If a student did not successfully complete 21% to 50% of their courses for a given year, student data were categorized as Yellow. If a student did not successfully complete 51% to 99% of their courses for a given year, student data were categorized as Red. If a student did not successfully complete 100% of their courses for a given term, student data were categorized as Black.

Data were analyzed separately for Course Completions at each program level (i.e., Undergraduate or Graduate) for each of the four KPIs (i.e., Withdrawals, Failures, Incompletes, and total number of W-F-Is). Thus, CPS students categorized as Blue or Green indicated that these students successfully completed the vast majority of their courses for a given year. Students categorized as Red or Black signified that the vast majority of the courses taken in a given year were not completed successfully.

Results:

With respect to rates for Graduation and Persistence, each of the Undergraduate and Graduate programs were provided their own respective data. Sample paragraphs were written to provide Academic Program Lead faculty (APL) for each program to use as a model for writing up results that were included in their Academic Quality Assurance Annual report. APLs thus were allowed to note specifically, not only the quantitative position on the continuum with which they found their respective program, but were also able to qualitatively determine where their respective program was in relation to the entire program through the use of an internal benchmark.

With respect to the four KPIs associated with Course Completions, percentages of students in each of the categories were provided to each of the APLs for their respective programs and KPIs were also provided for the program level in which they were located (i.e., Undergraduate or Graduate level). This allowed for each academic program to not only note quantitatively their respective position for these KPIs, but also

allowed for comparison a qualitative comparison with the internal benchmarks provided. Samples paragraphs were provided to each of the APLs as a means of providing a model for writing up the results for inclusion in their Academic Quality Assurance Annual report.

Additional support and guidance was provided for how to evaluate and develop a Progressive Refinement Plan (PRP) in which the results of these data could be used for improvement of the program. PRPs required that specific faculty be assigned and dates for completion of the plans. Each of the program write ups that included these indirect measures of Student Success were then reviewed by the Academic Quality Assurance (AQA) staff and feedback was provided to the APLs and revisions were made, as needed. Once the AQA review was complete, AQA Annual reports were then sent to the Academic Deans for the respective program level for approval.

Example of Results and Progressive Refinement Plan for the MS in Digital Media

The Digital Media program's Graduation Rate from FY 2008 through 2011 ranged from a low of 38% in 2011 to a high of 69% in 2009. Even with the lower percentage in 2011, the program presented percentages greater than two standard deviations above the baseline for all CPS graduate programs, whose mean during the same time period was 27%. When you combine the data for Graduated Student rates with those for Active Students during the same period, the Persistence rates can be derived. The Digital Media program did not graduate its first students until 2008. In 2009 and 2010 the Persistence rate was uneven, being slightly above graduate program average of 72% in 2009 (a rate of 75%), and significantly below it in 2010 (a rate of 55%). However, in the period from 2011 through 2013, the Graduate Program in Digital Media consistently exceeded the baseline CPS graduate program mean for the timeframe (from 81% to 86% for the program compared with the mean of 72%).

Therefore, with respect to this Key Performance Indicator, the Digital Media program was one of the top performing graduate programs in the College during this period. Overall, this indicates that student Persistence rates have not only trended an increase, but remained consistently high relative to the mean for the period from 2011 to 2013.

Based on the results of the Indirect measures of Student Learning, the program has excellent persistence, but comparatively has a low graduation rate. This could be due to a number of factors.

students are choosing to stay in the program longer to complete courses from a second concentration

students may be having problems completing or preparing for their thesis projects

To determine what these results mean, Cynthia Baron will initiate a project and contact Matt Henderson by end of July to request an Excel spreadsheet that would contain all Digital Media students, the courses that they have taken, what concentration each has declared, and which students are still in the program vs. those who have graduated.

Conclusion:

For the first year of the newly implemented AQA Program Evaluation plan, much success was noted (and documented). Specifically, all Undergraduate and Graduate academic programs were provided S-Series data (see NEASC definitions) for use in tracking and evaluating Student Success. Academic programs were also provided with historical data to assess trending of Student Success across multiple years of data. Providing individual academic programs with program level data in conjunction with establishment of signal values allowed for quantitative and qualitative assessment, evaluation, and comparison with internal benchmarks.

Ensuring the use of these data and the results of each program for use in development of Progressive Refinement Plans in AQA Annual reporting ensures that data decision making strategies are used and implemented at the program level. Thus, the use of KPIs and signal values with internal benchmarks afforded APLs with the insight of where their respective programs were with respect to Student Success, as defined by NEASC, as well as the opportunity to close the loop with respect to subsequent evaluations of the programs' Progressive Refinement Plans. As programs implement PRPs with success, the signal values, in conjunction with internal benchmarks are expected to gradually rise over time, thereby highlighting the fact that continuous improvement and refinement is truly an ongoing process and not an endpoint.

Implications for Future Research or Current Practices:

1. Holistic approaches to program evaluation that use of statistically derived signal values for KPIs can be used within colleges and universities to identify lessons learned from well-functioning programs to inform under-performing programs and identify areas for progressive refinement.
2. Descriptive analytics can further help inform the practices of various sectors within the institution: instructional design, enrollment, advising, academic support

References

Ambrose, S. A. (2010). *How learning works: Seven research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass

Brittingham, B. (2009, spring). Accreditation in the United States: How did we get to where we are? In P. M. O'Brien (Ed.), Accreditation: Ensuring and enhancing quality [Special edition]. *New Directions for Higher Education*, (2009)145, 7–27.
John P. Campbell, J. P., DeBlois P. B., & Oblinger, D. G. (2007). Academic analytics: A new tool for a new era. *EDUCAUSE Review, 42*(4), 40-57.

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the Community of Inquiry Framework: Review, Issues, and Future Directions. *Internet and Higher Education*, 10, 157-172.

Kelderman, E. (2013, February 13). Obama's accreditation proposals surprise higher education leaders. *The Chronicle of Higher Education.* Retrieved from http://chronicle.com/article/Obamas-Accreditation/137311/

Kirkpatrick, D. L. & Kirkpatrick, J. D. (2007). *Implementing the Four Levels: A Practical Guide for Effective Evaluation of Training Programs*. Berrett-Koehler Publishers, Inc.: San Francisco, CA.

New England Association of Schools and Colleges (NEASC), Commission on Institutions of Higher Education. (2012, August). *Student achievement and success*. Retrieved from http://cihe.neasc.org/downloads/POLICIES/Pp85_Student_Achievement_and_Success__Policy_Statement.pdf

New Leadership Alliance for Student Learning and Accountability. (2012). Committing to Quality: Guidelines for Assessment and Accountability in Higher Education. Retrieved from http://www.newleadershipalliance.org/images/uploads/committing%20to%20quality.pdf

Walvoord, B. E. (2010). *Assessment clear and simple* (2nd ed.). San Francisco, CA: Jossey-Bass.

Wiggins, G. P. (1998). *Educative assessment: Designing assessment to inform and improve student performance*. San Francisco, CA: Jossey-Bass.

GOING TEST-OPTIONAL:
GATHERING EVIDENCE AND MAKING THE DECISION AT ITHACA COLLEGE

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Introduction

In recent years, a growing number of colleges and universities[1] have adopted a "test-optional admission policy" that allows students to opt out of submitting standardized test scores as a part of their admission applications. In 2012, Ithaca College joined the group and implemented a test-optional policy for the admission applications of the fall 2013 entering cohort. Ithaca College is a mid-sized four-year comprehensive private college in central New York. The College promotes experiential and integrative learning by blending performing arts, liberal arts and professional programs primarily for undergraduates.

Little research on this subject has been done by small or medium-sized comprehensive private institutions like Ithaca College. In fact, this type of school might be best suited for a test-optional admission policy. The present study is an effort to provide an institutionally-specific research example to such institutions that are considering implementation.

The study includes a literature review, an explanation as to why Ithaca College's enrollment management team decided to propose a test-optional policy, and the step by step research methodology. The study also provides a discussion of the research results that played a pivotal role in gaining institutional approval for moving the College to the test-optional policy. Lastly,

the results gathered from the first test-optional cohort that enrolled in fall 2013 and conclusions for consideration in the future are presented.

Literature Review

The controversy over the validity of the use of standardized test scores in the college admission process is nothing new. The early intent of the creation of the SAT was to open the doors of higher education to students without traditionally-valued credentials; the objective testing scheme was seen as a way to "level the field". Along with this goal, colleges and universities also saw standardized testing as a way to enhance their prestige by showing that their students were highly qualified based on the test results -- not based on social class or connections (Epstein, 2009). The premise that standardized testing can effectively identify qualified students and accurately predict their future academic success justified use of these tests and led to them dominating the college admissions world in the latter half of the 20th century.

This premise, however, has become subject to severe scrutiny in recent years. The main criticism is that standardized tests are culturally biased against subgroups including racial minority groups, females, first generation students, and those from low-income strata (e.g., Zwick, 2004, 2007). Empirical studies have revealed that female students' SAT math scores are lower than males by one-third of a standard deviation while Latinos' and Afro Americans' scores are lower than whites by two-thirds and one standard deviation respectively (Rosner, 2012). The critics argue, therefore, that standardized tests structurally maintain -- or worse augment -- the already existing gap between advantaged and disadvantaged applicants, by imposing "a devastating impact on the self-esteem and aspirations of young students" (Atkinson, 2001).

Furthermore, it has been argued that standardized test measures are not only culturally biased, but that they also may not be the best predictor of future academic achievements in college. The studies have consistently found that SAT scores do not predict the college first-year GPA as effectively as other measures such as high school GPA or AP credits (e.g., Cornwell, Mustard, and Van Parys, 2012). The College Board research team has examined the incremental validity attributed to SAT scores over high school GPA (HSGPA) in predicting the first-year college GPA (FYGPA). The study used a large cross-sectional sample of data from the 2006 cohort who took the revised SAT with the newly added SAT writing section. They found that when HSGPA was taken into account, the incremental validity attributed to SAT was 0.08, which was lower than the incremental validity associated with HSGPA over SAT scores ($r = 0.09$). Because of these results, they recommended that colleges use both HSGPA and SAT scores to make the best predictions of student success (Kobrin, Patterson, Shaw, Mattern, and Barbuti, 2008).

An increasing amount of evidence, therefore, suggests that the additive power of standardized test scores in predicting students' performance in college is smaller than was once believed when high school GPA or AP credits are taken into account. However, the majority of this research evidence is provided by large testing agencies (NACAC, 2008), selective large public (*e.g.,* Cornwell, *et al.,* 2012), private research universities (*e.g.,*Wonnell, Rothstein, and Latting, 2012) or selective liberal arts colleges (*e.g.*, Rask and Tiefenthaler, 2012). Little research has been conducted by smaller comprehensive colleges like Ithaca College despite the fact that such schools might be best suited for adopting a test-optional admission policy. The present study is an effort to provide a research example to this type of school in deciding whether or not to implement a test-optional policy.

Ithaca College's Test-Optional Policy Proposal

In 2009, the College's internal study revealed a high correlation between Ithaca College's admission application numbers and the number of public high school graduates in Northeast. It was forecasted by the National Center for Educational Statistics (NCES) that the Northeast market would shrink by more than ten percent between 2008 and 2018 (NCES, 2009a).

In 2009, the College decided to strategically position itself for breaking away from the predicted rapid decline of the high school graduate population in Northeast. The strategies laid out include the launch of an integrative marketing campaign around the "Ready" theme, and the strategic increase in financial aid to enroll more desirable students while raising tuition at a slower pace. Furthermore, the enrollment management team proposed a test-optional admission policy in order to increase applications not only from its primary markets, but also from more racially diverse communities. Approximately 15% of Ithaca's freshmen class was from the ALANA (African-American, Latino/a, Asian and Native American) communities in 2009 while the institutional plan aimed to grow the ANALA student population from 15% to 20% by 2020.

Research Goals

The following three research goals are formed. The first goal is to examine how well SAT math, SAT critical reading and SAT writing scores could explain students' academic performance in college after controlling for the effect of non-SAT indicators such as high school GPA or AP credits. In other words, this study wants to compare the College's results with those of previous studies in terms of the incremental validity associated with standardized test scores in predicting students' college performance after taking other effects into consideration. If this

study finds an insignificant incremental validity of test scores, this would be supporting evidence for instituting a test-optional policy.

The second goal is to analyze and evaluate a crucial difference between this study and others regarding how to measure the effect of non-SAT indicators. The majority of previous studies have indicated "high school GPA" or "number of AP credits taken" as non-SAT measures used for college admission (*e.g*., Cornwell *et al*., 2012). Smaller Colleges like Ithaca, however, often utilize a more personalized approach. For example, Ithaca College's admission office is committed to the "holistic" application review process, meaning that reviewers make an admission decision by evaluating a student's all-rounded ability with various measures such as high school GPA, class rank, transcripts, the profile of high school attended, recommendations, essays, extra-curricular activities, leadership skills, evaluation from recommended on-site interviews, and audition scores for music and theatre candidates, in addition to standardized test scores. In this study, an additional consideration is introduced. To capture a component of the "holistic review", a numerical variable called "Strength of High School Schedule" is created, which is a reviewer's evaluation on how much a student has challenged him or herself in a broad array of learning at high school. Since "Strength of Schedule" scores were not originally recorded in the computer system, reviewers were instructed to re-evaluate students' admission materials randomly selected from the fall 2007 entering cohort and to record "Strength of Schedule" scores on a ten-point scale in a Microsoft Access database created for the present study. Details are discussed in the following methodology section.

The last goal of the current study is to demonstrate that a valid research study can be done even with a smaller sample size. Previous studies used very large data sets with over 3,000 cases (*e.g.*, Wonnell, *et al.*, 2012). While it is true that the larger the sample, the smaller the sampling

error, small-sized colleges may not have a large amount of historical data ready for analyses. The present study demonstrates that valid research results can be obtained from approximately 500 sampled cases (see below for details) as long as an appropriate sampling methodology is applied.

Research Methodology and Data

To ensure the objectivity of research, the research procedure was established by a cross-division project team including the Vice President of Enrollment and Communication; the Director of Enrollment Planning, the Director and Associate Director of Admission, and the Director and other members of Institutional Research.

The research methodology was well documented by the original study (Borch and Mulugetta, 2010). The project team decided that the study should focus on fall 2007 first-time full-time freshmen who were retained at Ithaca College to their fifth semester, a total of 1,387 students at the time of this study. Further, the decision was made to take a random sample of 520 (500 plus 20 additional in case of some missing data problems), stratified by gender and school when they entered the College as first-time freshmen. This sample size was chosen with the understanding that it would result in a sampling error of approximately 4% (Suskie, 1992).

Since the College has not established a data warehouse or an enterprise content management system, old students' records are still kept in paper form. Thus, photocopies of the sampled students' high school transcripts were obtained from the paper records of the Registrar's Office and reviewed by members of the Admission Office staff who are typically involved in the applicant review process. The results of this high school transcript review for each student were entered by the Admission staff into a Microsoft Access database created by Institutional

Research. The high school transcript data were then matched using SPSS to profile data already available in the fall 2007 opening enrollment files of Institutional Research as well as other data. Review of the 520 sampled students' high school transcripts revealed that 48 students should be dropped from the study due to missing or incomplete transcripts. An additional 4 students were excluded from the study because these cases show extremely large residuals above 3 standard deviations in the preliminary regression analysis. Thus, the total number of students included in this study's final analysis was 468. A complete breakdown of numbers and proportions of students by original IC school and gender who were in the initial population and in the final study analysis are provided in Table 1. The sample is slightly skewed to males in comparison to the population. However, overall the sample used for the final analysis is judged to be a reasonable representation of the population.

A list of variables studied is presented in Table 2. The majority of the variables listed are self-explanatory. However, two variables deserve special attention. As mentioned earlier, "Strength of High School Schedule" on a 10-point scale, measures a reviewer's evaluation of how much a student has challenged him or herself in a broad array of learning at high school. The intent was for this variable to capture a component of the "holistic" admission review process to which many small colleges are committed. Unfortunately, such measures have not been included in previous studies as pointed out earlier (Sternberg, 2012). In addition to conventional non-SAT measures such as high school GPA, AP credits and high school percentile rank, the inclusion of "Strength of High School Schedule" might reveal the importance of the holistic admission review process to predict a student's success in college, which might further solidify the argument for a test-optional policy.

The second significant difference is that previous studies most often used first-year GPA as a dependent variable whereas this study uses the cumulative IC GPA at the end of the 6th semester which is, we believe, a more stable measurement of a student's long-term academic performance in college. Some previous studies found that high school grades are better indicators of grades beyond the freshman year in college than admission test scores (*e.g.*, Geiser, 2007).

Table 1: Students in the Population vs. in the Analysis

Fall 2007 First-time Full-time Freshmen Retained to 5th Semester

Females

Ithaca College School	Population		Sample in Analysis	
	Hdct	% of Total Population	Hdct	% of Total Sample
Business	62	4.5%	21	4.5%
Communications	172	12.4%	60	12.8%
HSHP	187	13.5%	62	13.2%
H&S*	337	24.3%	112	23.9%
Music	60	4.3%	20	4.3%
Female Total	818	59.0%	275	58.8%

Males

Ithaca College School	Population		Sample in Analysis	
	Hdct	% of Total Population	Hdct	% of Total Sample
Business	104	7.5%	34	7.3%
Communications	107	7.7%	38	8.1%
HSHP	101	7.3%	37	7.9%
H&S*	202	14.6%	65	13.9%
Music	55	4.0%	19	4.1%
Male Total	569	41.0%	193	41.2%
Grand Total	1387	100%	468	100.0%

Note: H&S includes a small number of students in the Division of Interdisciplinary and International Studies

Table 2: Variables Used in the Study

Background Variables	Data Range	Data Source
Gender	0 – 1 *(Female)*	IR*'s fall 2007 opening enrollment data file (original source: final fall 2007 Admission data file)
Ethnicity *(ALANA or not)*	O – 1 *(ALANA)*	
First Generation	O – 1 *(1st Generation)*	

Other Independent Variables	Data Range	Data Source
H.S class rank percentile	1 – 100	IR's fall 2007 opening enrollment data file (original source: final fall 2007 Admission data file)
SAT scores *(Math, Critical Reading & Writing)*	1 – 800	
Number of AP credit hours *(at entry to Ithaca College)*	1 – 800	IR's study of FTFT AP and transfer credits
H.S. academic GPA *(4-point scale; converted if not 4-point scale originally)*	1 – 4	High school transcript review
Strength of high school schedule *(10-point scale)*	1 – 10	

Dependent Variable	Data Range	Data Source
Cumulative Ithaca College GPA at end of 6th semester	1 – 4	IR's spring 2010 course enrollment data file

**IR is the Office of Institutional Research*

Statistical Models and Analysis

Hierarchical regression is chosen as the most appropriate statistical technique to investigate the questions presented above. In hierarchical regression, the order of the inclusion of independent variables is primarily determined by a researcher which differs from other multivariate regression techniques such as stepwise regression. Although detailed discussions on statistical modeling are beyond the scope of this paper, it is useful to briefly explain how this statistical technique is used in this study.

Hierarchical Regression Model 1

$$Yj = \beta 0j + \beta 1j*(D1j) + \beta 2j*(D2j) + \beta 3j*(D3j) + ej$$

where j=1 (subscript j refers to the level of variables included in the model)
Yj refers to the dependent variable, the 6th semester cumulative GPA at Ithaca College
D1j… D3j refer to dichotomous variables (ALANA, Gender and First Generation) in Model 1.
β0j refers to the intercept of Model 1.
β1j … β3j refer to the beta coefficients associated with predictors D1j … D3j.
ej refers to the random errors of prediction for Model 1.

Hierarchical Regression Model 2

$$Yj = \beta 0j + \beta 1j*(D1j) + \ldots + \beta 3j*(D3j) + \beta 4j*(X1j) + \ldots + \beta 6j*(X3j) + ej$$

where j=2 (subscript j refers to the level of variables included in the model)
Yj refers to the dependent variable, the 6th semester cumulative GPA at Ithaca College
In addition to the independent variables included in Model 1,
X1j … X3j refer to non-SAT predictors (AP credit hours, high school GPA and Strength of Schedule).
β0j refers to the intercept of Model 2.
β4j … β6j refer to the beta coefficients associated with predictors X1j … X3j.
ej refers to the random errors of prediction for Model 2.

Hierarchical Regression Model 3

$$Yj = \beta 0j + \beta 1j*(D1j) + \ldots + \beta 3j*(D3j) + \beta 4j*(X1j) + \ldots + \beta 6j*(X3j) + \beta 7j*(X4j) + \ldots + \beta 9j*(X6j) + ej$$

where j=3 (subscript j refers to the level of variables included in the model)
Yj refers to the dependent variable, the 6th semester cumulative GPA at Ithaca College
In addition to the independent variables included in Model 2,

X4j ... X6j refer to three SAT predictors (SAT Math, SAT Critical Reading and SAT Writing).
β0j refers to the intercept of Model 3.
β7j … β9j refer to the beta coefficients associated with the SAT predictors.
ej refers to the random errors of prediction for Model 3.

The focus of the hierarchical regression analysis is on the statistical significance associated with incremental change in R-square among the three models. This examines the magnitude and the statistical significance of the increment in the predictive validity attributed to the SAT scores when the predictive power associated with background variables and non-SAT evaluation measures is taken into consideration.

Results: Descriptive Statistics

Descriptive statistics are presented in Tables 3 and 4. Due to the large number of students missing high school class rank percentile data, it was decided to exclude this variable from the subsequent analyses. All predictors except for First Generation are significantly correlated with the 6th Semester CUM GPA at Ithaca College. Without controlling other variables, bivariate negative correlations of ALANA and the academic measures indicate that minority students appear to have lower scores in the 6th semester CUM GPA, AP credit hours and in all SAT scores. Female students tend to perform better at Ithaca College than their male counterparts. While SAT critical reading is gender neutral, male students tend to do better with SAT math scores and females score higher with SAT writing. It is important to note that High School GPA and Strength of Schedule are not significantly correlated with ALANA or First Generation status, revealing the importance of applying these measures to the admission process in order to mitigate the risk of using standardized test scores alone for college admissions. Significant correlations among the predictors indicate that caution is necessary because of a possible multi-collinearity problem in regression analysis.

Table 3: Descriptive Analysis

Variable	N	Min	Max	Mean	Std. Dev.
IC_6SEM_CUMGPA	468	2.2	4.0	3.35	0.39
ALANA	468	0	1	0.10	0.31
First generation college student	468	0	1	0.13	0.34
GENDER	468	0	1	0.59	0.49
High school class rank percentile	252	35.0	100.0	81.24	14.70
AP_CR_HRS	468	0.0	48.0	5.28	8.57
HS_GPA	465	2.0	4.0	3.38	0.46
STRENGHT_SCHEDULE	468	3.0	10.0	7.21	2.28
Max SAT verbal *(includes converted ACTV) (in 100s)*	468	3.7	8.0	5.97	0.81
Max SAT math *(includes converted ACTM) (in 100s)*	468	3.9	7.9	6.00	0.69
Max SAT writing	452	3.5	8.0	5.83	0.76

Table 4: Correlations

Variables		IC_6SEM_CUMGPA	ALANA	FIRSTGEN	GENDER	AP_CR_HRS	HS_GPA	STRENGTH_SCHEDULE	SATV	SATM	SATW
IC_6SEM_CUMGPA	Pearson	1									
	Sig. (2-tailed)										
	N	468									
ALANA	Pearson	-.118	1								
	Sig. (2-tailed)	.010									
	N	468	468								
FIRSTGEN	Pearson	-.032	.155	1							
	Sig. (2-tailed)	.492	.001								
	N	468	468	468							
GENDER	Pearson	.260	.004	.035	1						
	Sig. (2-tailed)	.000	.924	.456							
	N	468	468	468	468						
AP_CR_HRS	Pearson	.388	-.121	-.031	.023	1					
	Sig. (2-tailed)	.000	.009	.498	.614						
	N	468	468	468	468	468					
HS_GPA	Pearson	.631	-.080	.005	.207	.433	1				
	Sig. (2-tailed)	.000	.086	.908	.000	.000					
	N	465	465	465	465	465	465				
STRENGTH_SCHEDULE	Pearson	.406	-.041	.053	.119	.489	.490	1			
	Sig. (2-tailed)	.000	.380	.255	.010	.000	.000				
	N	468	468	468	468	468	465	468			
SATV	Pearson	.356	-.116	-.090	.031	.455	.388	.302	1		
	Sig. (2-tailed)	.000	.012	.051	.503	.000	.000	.000			
	N	468	468	468	468	468	465	468	468		
SATM	Pearson	.291	-.146	-.065	-.191	.406	.292	.296	.444	1	
	Sig. (2-tailed)	.000	.002	.163	.000	.000	.000	.000	.000		
	N	468	468	468	468	468	465	468	468	468	
SATW	Pearson	.415	-.132	-.145	.102	.442	.411	.337	.697	.493	1
	Sig. (2-tailed)	.000	.005	.002	.030	.000	.000	.000	.000	.000	
	N	452	452	452	452	452	449	452	452	452	452

Results: Hierarchical Regression Analysis

The results from the hierarchical regression analysis are presented in Tables 5, 6, 7 and 8. Table 5 summarizes the explanatory power of the overall models in a hierarchical fashion. Model 1 first uses only three background measures (ALANA status, gender and First Generation status) as predictors of the sixth semester CUM GPA in college. The result indicates 0.085 R-square, indicating that 8.5% of variance of the dependent variable is successfully explained by these three dichotomous variables. Model 2, which inserts three additional non-SAT measures (AP credit hours, High School GPA and Strength of Schedule) in the equation, shows that R-square was elevated to .437. The change in R-square attributed to these additional three non-SAT measures is .353, which is highly significant. Lastly, when the three SAT scores are inserted in the equation in Model 3, the incremental change in R-square is surprisingly small at .018, although the F-test on the change is still statistically significant (p=.002). This finding may imply that SAT scores would not predict college academic performance as effectively as non-SAT measures.

To clarify this point, the R-square changes are further tested in another way by inserting background variables first, then three SAT scores, and lastly non-SAT measures in the equation. As presented in Table 6, the change in R-square attributed to three non-SAT scores after controlling for SAT scores is .190, ten times greater than .018, which is the change in R-square attributed to three SAT variables after considering the effects of non-SATs, as previously observed in Table 5. This affirms the finding that non-SAT measures are better than the SATs in predicting the sixth semester CUM GPA at Ithaca College.

Multiple R (or correlation coefficient R) is the square root of R-square. Multiple R measures the degree to which a group of independent variables is correlated to the dependent variable.

The change in Multiple R shows the increment in validity solely attributed to SAT scores in predicting the 6th semester CUM GPA, after the effect of the non-SAT measures as a whole is taken into account. As presented in Table 5, the increment of R of the SAT scores is small: 0.012 (the difference between .669 and .657). But that incremental value is statistically significant. This result is similar, yet more pronounced in comparison to the 2008 College Board study (Kobrin *et al.*, 2008). The College Board study found that the incremental validity attributable to the SAT was 0.08 while controlling for the effect of self-reported high school GPA to predict the college first year GPA. The finding of this study is much smaller than the conclusion of the College Board study's. We believe that this difference is due to two factors: 1) the College Board study used the self-reported high school GPA alone as a non-SAT predictor whereas Ithaca College's study used three non-SAT variables, resulting in more predictive power attributed to the non-SAT measures, and 2) the College Board study used first-year GPA as a dependent variable whereas we used the cumulative IC GPA at the end of the 6th semester which is, we believe, a more stable measurement of a student's long-term academic performance in college.

Overall predictive power of Model 1, Model 2 and Model 3 is highly significant as indicated by the ANOVA results (Table 7). Table 8 reveals further insights about the hierarchical regression analysis. Collinearity statistics indicate the existence of collinearity among the academic predictors, but it is not severe enough to discard the analysis. In Model 1, without taking any other variables into account, ALANA and gender status variables appear to be significant predictors of academic performance at Ithaca College. In Model 2, three non-SAT predictors, that is, high school GPA, AP credit hours and Strength of Schedule are statistically significant. Two observations are noteworthy. First, as mentioned earlier "Strength of

Schedule" measures a reviewer's evaluation of how much a student has challenged him or herself in a broad array of learning in high school. The statistical significance ($p<.10$) of this predictor, unique to the present study, indicates that Strength of Schedule may quantify an important characteristic that cannot be evaluated by high school GPA or AP credits. Second, when these three non-SAT predictors are added to the equation, the ALANA status becomes no longer significant, which implies the importance of use of these non-SAT measures for selecting qualified students with minority backgrounds.

When SAT scores are added to the model (Model 3), only SAT writing becomes significant in predicting students' sixth semester performance. This confirms previous findings in earlier studies that the SAT writing score is the best predictor of college academic performance among the three SAT measures (Kobrin, *et al.*, 2008). Gender, high school GPA and Strength of Schedule remain statistically significant in Model 3. The finding implies that adding only one SAT score -- SAT writing -- may marginally improve Ithaca College's ability to predict students' performance in college. High school GPAs, Strength of Schedule and Gender remain statistically significant in the projection of students' academic performance three years after enrolling at Ithaca College.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.291[a]	.085	.078	.37714	.085	13.695	3	445	.000
2	.661[b]	.437	.430	.29670	.353	92.331	3	442	.000
3	.675[c]	.456	.444	.29279	.018	4.956	3	439	.002

a. Predictors: (Constant), FIRSTGEN, GENDER, ALANA

b. Predictors: (Constant), FIRSTGEN, GENDER, ALANA, AP_CR_HRS, HS_GPA, STRENGHT_SCHEDULE

c. Predictors: (Constant), FIRSTGEN, GENDER, ALANA, AP_CR_HRS, HS_GPA, STRENGHT_SCHEDULE, SATM, SATV, SATW

d. Dependent Variable: IC_6SEM_CUMGPA

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.291a	.085	.078	.37714	.085	13.695	3	445	.000
2	.515b	.265	.255	.33899	.181	36.258	3	442	.000
3	.675c	.456	.444	.29279	.190	51.162	3	439	.000

a. Predictors: (Constant), FIRSTGEN, GENDER, ALANA

b. Predictors: (Constant), FIRSTGEN, GENDER, ALANA, SATV, SATM, SATW

c. Predictors: (Constant), FIRSTGEN, GENDER, ALANA, SATV, SATM, SATW, AP_CR_HRS, HS_GPA, STRENGHT_SCHEDULE

d. Dependent Variable: IC_6SEM_CUMGPA

Table 7: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.843	3	1.948	13.695	.000[b]
	Residual	63.293	445	.142		
	Total	69.136	448			
2	Regression	30.227	6	5.038	57.229	.000[c]
	Residual	38.909	442	.088		
	Total	69.136	448			
3	Regression	31.502	9	3.500	40.829	.000[d]
	Residual	37.635	439	.086		
	Total	69.136	448			

a. Dependent Variable: IC_6SEM_CUMGPA

b. Predictors: (Constant), FIRSTGEN, GENDER, ALANA

c. Predictors: (Constant), FIRSTGEN, GENDER, ALANA, AP_CR_HRS, HS_GPA, STRENGHT_SCHEDULE

d. Predictors: (Constant), FIRSTGEN, GENDER, ALANA, AP_CR_HRS, HS_GPA, STRENGHT_SCHEDULE, SATM, SATV, SATW

Table 8: Coefficient Analysis

Model		Unstandardized		Standardized	t	Sig.	Correlations			Collinearity	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.240	.029		113.402	.000					
	ALANA	-.132	.060	-.101	-2.203	.028	-.105	-.104	-.100	.985	1.015
	GENDER	.215	.036	.270	5.949	.000	.269	.271	.270	.999	1.001
	FIRSTGEN	-.042	.054	-.035	-.770	.442	-.038	-.036	-.035	.984	1.016
2	(Constant)	1.735	.112		15.510	.000					
	ALANA	-.070	.047	-.053	-1.473	.141	-.105	-.070	-.053	.972	1.029
	GENDER	.121	.029	.152	4.142	.000	.269	.193	.148	.947	1.056
	FIRSTGEN	-.045	.043	-.038	-1.059	.290	-.038	-.050	-.038	.980	1.021
	AP_CR_HRS	.005	.002	.120	2.800	.005	.388	.132	.100	.697	1.435
	HS_GPA	.417	.037	.490	11.322	.000	.623	.474	.404	.681	1.469
	STRENGTH_SCHEDULE	.016	.008	.092	2.090	.037	.412	.099	.075	.654	1.528
3	(Constant)	1.260	.174		7.259	.000					
	ALANA	-.052	.047	-.040	-1.099	.272	-.105	-.052	-.039	.960	1.041
	GENDER	.131	.030	.165	4.336	.000	.269	.203	.153	.859	1.165
	FIRSTGEN	-.020	.043	-.017	-.467	.641	-.038	-.022	-.016	.955	1.048
	AP_CR_HRS	.003	.002	.063	1.397	.163	.388	.067	.049	.605	1.654
	HS_GPA	.383	.038	.449	10.159	.000	.623	.436	.358	.634	1.576
	STRENGTH_SCHEDULE	.013	.008	.074	1.690	.092	.412	.080	.059	.645	1.550
	SATM	.042	.025	.073	1.649	.100	.294	.078	.058	.633	1.579
	SATV	.004	.025	.009	.173	.863	.369	.008	.006	.470	2.130
	SATW	.058	.027	.113	2.122	.034	.418	.101	.075	.440	2.272

a. Dependent Variable: IC_6SEM_CUMGPA

New Evidence from the First Test-Optional 2013 Cohort

The above research was completed in fall 2010 whereas the Ithaca College's test-optional policy was officially announced in spring 2012. The research results played a pivotal role in

gaining institutional approval for moving Ithaca College to a test-optional policy in 2012 for admission of the 2013 entering cohort.

In one of his recent publications, Ithaca College President Rochon wrote, "We expected that eliminating standardized tests as a required element of the application would enable us to increase the number of highly qualified applicants to the college, increase the quality of the enrolled freshman class, and increase the diversity of that class. And we fared well against those goals." (Rochon, 2013).

In fact, the College's freshman applications increased by more than 13% in 2013. ALANA applications surged by more than 23% while the non-ALANA group was up by 10%. Twenty-eight percent of the total applicants opted out from the submission of SAT scores. 40% of ALANA applicants chose to opt out of the test score submission while 23% of non-ALANA students selected this option. A chi-square test indicates the test-optional difference between ALANA and non-ALANA students is highly significant.

Furthermore, when high school GPA and class rank were used to measure the academic quality of the applicants, average high school GPA was slightly lower than the previous year by .02 point while class rank average was identical to the class of 2012.

Building upon this robust application base, Ithaca College successfully enrolled 1789 freshmen, 89 students more than the goal of 1700. The 2013 class is the most diverse in the College's history; that is, students with minority backgrounds account for 22% of the freshman class in comparison to 18% of the previous year. Ithaca's research team plans to conduct a follow-up study by measuring academic performance of the 2013 class who opted out of SAT submission in comparison to those who did not. More detailed analysis on this topic will be presented in the near future.

Conclusion

Ithaca College, a mid-sized four-year private college in central New York, successfully implemented a test-optional policy in 2012 for admission of the 2013 entering cohort. This study has discussed research methodology and results which played a pivotal role in gaining institutional approval for moving the College to the test-optional practice. To date, little research on this subject has been done by smaller comprehensive institutions like Ithaca College, which promotes experiential and integrative learning by combining theory and practice primarily for undergraduates. Such schools could be best suited for instituting a test-optional admission policy. This study shares useful research information with the institutions considering implementation of a test-optional admission policy.

Using 468 cases which were stratified and randomly selected from the fall 2007 entering cohort, the study investigated the incremental validity of SAT scores in predicting the 6^{th} semester cumulative GPA in college when the effects of background variables (minority, gender, and first generation status) and non-SAT predictors (High School GPA, AP credits, and Strength of High School Schedule) were statistically taken into consideration.

Hierarchical regression analysis was conducted, which allowed us to insert three background variables at first, then three non-SAT predictors, and finally three SAT scores in the equation. The change in R-square attributed to three non-SAT measures was 35.3%. In contrast, the incremental R-square change associated with three SAT scores was only 1.8% although the F-test on the change was statistically significant. Even with the relatively small sample, this finding confirms the results of previous large studies, indicating that standardized tests add relatively small power in predicting students' academic performance in college.

The present study has also revealed the critical importance of Strength of Schedule along with high school GPA and AP credits in the admission process if an institution does indeed decide to implement a test-optional policy. These non-SAT measures seem to play a particularly significant role in admitting qualified students from minority groups.

By instituting a test-optional policy coupled with other strategies, Ithaca College successfully increased applications by more than 13% in 2013 compared to one year ago, while maintaining the essentially identical academic quality of applicants. ALANA applications surged by more than 23% and as a result, the fall 2013 freshman class is the most diverse in its history, with 22% of the class from minority groups. Ithaca College's experience indicates that adopting a test-optional policy could be one good practice to foster diversity on campus while maintaining race-neutral admission policies. More research is needed to link test-optional and race-neutral admission policies as society intensely debates the issue of admission policies.

Notes

1. Approximately 850 institutions were test-optional schools in 2012, according to *SAT Wars: The Case for Test-Optional College Admissions*, edited by J. A. Soares, Teachers College, Columbia University, New York and London.

References

Atkinson, R. C. (2001). *Standardized Tests and Access to American Universities*, The 2001 Robert H. Atwell Distinguished Lecture, delivered at the Eighty-third Annual Meeting of the American Council on Education, Washington, D.C., February 18, 2001, retrieved from http://works.bepress.com/richard_atkinson/36/

Borch, C. and Mulugetta, Y. (2010). *ITHACA COLLEGE: SAT Importance Study*, Unpublished paper, Ithaca College, Ithaca, NY.

Cornwell, C., Mustard, D. B. and Van Parys, J. (2012). "The New SAT and Academic Performance at a Flagship Public University," in *SAT Wars: The Case for Test-Optional*

College Admissions, edited by J. A. Soares, Teachers College, Columbia University, New York and London.

Epstein J. P., (2009). Behind the SAT-Optional Movement: Context and Controversy, retrieved from http://www.maguireassoc.com/resource/documents/SAT_optional_article-NACAC_Journal_College_Admission_J.Epstein_7-09.pdf

Geiser, S. and Santelices, M. V., (2007). *Validity of High-School Grades in Predicting Student Success Beyond the Freshman Year: High-School Record vs. Standardized Tests as Indicators of Four-Year College Outcomes*., Berkeley, CA: Center for Studies in Higher Education, University of California, Berkeley, 2007, CSHE.6.07.

Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., and Barbuti, S. M. (2008). *Validity of the SAT for Predicting First-Year College Grade Point Average*, College Board Research Report: No. 2008-5, The college, Board, New York.

National Association for College Admissions Counseling (NACAC). (2008). *Report of the Commission on the Use of Standardized Tests in Undergraduate Admissions*. Arlington, VA: Author.

National Center of Educational Statistics (NCES). (2009a). retrieved from http://nces.ed.gov/programs/projections/projections2018/tables/table_25.asp?referrer=report

Rask, K. and Tiefenthaler, J. (2012). "The SAT as a Predictor of Success at a Liberal Arts College," in *SAT Wars: The Case for Test-Optional College Admissions*, edited by J. A. Soares, Teachers College, Columbia University, New York and London.

Rochon, T. (2013), *The Case Against the SAT*, USNEWS.COM/Opinion, 9/06/2013 retrieved from http://www.usnews.com/opinion/articles/2013/09/06/why-the-sats-shouldnt-be-a-factor-in-college-admissions

Rosner, J. (2012). "The SAT: Quantifying the Unfairness Behind the Bubbles," in *SAT Wars: The Case for Test-Optional College Admissions*, edited by J. A. Soares, Teachers College, Columbia University, New York and London.

Sternberg, R. J. (2012). "College Admissions Assessments: New Techniques for a New Millennium," in *SAT Wars: The Case for Test-Optional College Admissions,* edited by J. A. Soares, Teachers College, Columbia University, New York and London.

Suskie, L. A. (1992), Questionnaire Survey Research: *What Works, Association for Institutional Research, Resources for Institutional Research No. 6*, Florida State University, Tallahassee, FL.

Wonnell, T., Rothstein, C. M. and Latting, J. (2012). "Predictor of Success at Highly Selective Private Research University," in *SAT Wars: The Case for Test-Optional College*

Admissions, edited by J. A. Soares, Teachers College, Columbia University, New York and London.

Zwick, R., ed. (2004). *Rethinking the SAT: The Future of Standardized Testing in University Admissions*, New York, RoutledgeFalmer.

Zwick, R., (2007). "College Admission Testing," National Association for College Admission Counseling, Arlington, VA.

Tania Das

Influence of factors on cumulative GPA of freshman and transfer students

Abstract

Binghamton State University, a doctoral institution enrolls freshman and transfer students for the baccalaureate degree. This study was carried out to find if there was a difference in academic achievement measured in terms of cumulative GPA between freshman and transfer students using T-test and also to examine if the demographic, cognitive, non-cognitive and financial aid variables had significant influence on the cumulative GPAs of both freshman and transfer students using multiple regression analysis. The results revealed that senior freshman students scored a slightly higher cumulative GPA as compared to the senior transfer students. The study also provided evidence that non-cognitive factors of college impression and college academic experience for native students; cognitive variables of SAT score, community college GPA and Advanced Placement (AP) credits; demographic variables of gender and ethnicity were the significant variables and predictors of cumulative GPA's of both the groups.

Introduction

Undergraduate students enter four year colleges and universities as freshman and transfer students. Freshman students start their academic career at a 4 year university immediately after high school and transfer students change over to a prospective 4 year university from another postsecondary institution to obtain their baccalaureate degree. According to the State University of New York NYSUNY 2020 plan, Binghamton University's admissions office will increase enrollment by 500 students, which includes New Freshman and New Transfer students every year for the next 5 years with the goal of a total enrollment of 2,000 new students by the end of year 2017. The ratio of New Freshman to New Transfer students normally enrolled in

Binghamton University has been approximately 7 to 3 from years 2008 - 2012. Administrators at Binghamton University need to make a decision about whether to project the same or increase the ratio of freshman to transfer students based on the past academic success such as cumulative GPA, timely graduation of freshman and transfer students.

Over the years, administrators raised the question related to the academic success of transfer students when compared to that of freshman students. Several studies examined the academic performance and experiences of community college transfer students when compared to freshman university students (Gold, 1971; Nolan & Hall, 1978). Many of these studies revealed that community college transfer students had lower GPAs when compared to their freshman student counterparts (Gold, 1971; Nolan & Hall, 1978; Hoyt & Winn, 2004).

Beside the comparison of cumulative GPA between the two groups, the identification of the significant cognitive, demographic, non-cognitive and financial aid variables are important to predict student's academic achievement such as cumulative GPA in the four year institution. Student's ability to get higher cumulative GPA can increase graduation and retention rate. The present study could help administrators determine how to best prepare the incoming freshman and transfer students to achieve the desired outcome of timely graduation.

Brief Review of Literature

In this study, I investigated the influence of cognitive, non-cognitive, demographic and financial aid factors on cumulative GPA of both freshman and transfer students. First, I briefly reviewed the current literature on the cognitive variables in relation to students' academic performance as mentioned in the following paragraph.

Several researchers (e.g., Graham and Dalam, 1986; Emires and Mullen, 1997; Cejda et al., 1998; Carlan and Byxbe, 2000) examined cognitive variables such as transfer GPA and

standardized test scores to identify students at risk for attrition (drop-out). Graham and Dallam (1986) found that in comparison to freshman students, transfer students were more likely to be placed on academic probation as a result of their lower first semester GPAs at the four year institute. Emires and Mullen (1997) observed that significant predictors of graduation among students who transferred to the University of Missouri in 1987 and 1988 were the student's transfer GPA and the student being enrolled at the Engineering Campus. Carlan and Byxbe, (2000) also observed that the significant predictors of upper division GPA for community college transfers were lower division GPA and choice of major at the four year institution. Variables not contributing significantly were gender, associate degree attainment, full time or part time enrollment, transfer credit hours and majoring in the arts.

Next, as student's pre-entry attributes played an important role in academic performance, I made an attempt to research on both demographic and cognitive variables on the students' performance. A group of investigators (e,g., Towsend et al., 1993; Glass and Harrington, 2002) examined demographic variables such as age, gender, ethnicity, socio-economic status along with cognitive variables such as entering GPA as predictors of university academic success and degree persistence. Duggan and Pickering (2008) used logistic regression model and examined demographic variables, gender and ethnicity in predicting academic success/difficulty for freshman transfer students and the result indicated both gender and ethnicity were significant variables.

As I found both demographic and cognitive variables may not sufficiently explain the academic performance of the students, the addition of non-cognitive factors in my study may explain students' academic performance better. So I discussed literature on this issue in the following two paragraphs.

While considering the relationship between non-cognitive factors and student's success, Tinto (2005) classified the variables into five primary categories e.g., pre-entry attributes such as age, gender, racial group affiliation, and marital status; student commitments such as student's overall satisfaction and sense of belonging; institutional experiences such as interaction with staff and with faculty both inside and outside the classroom; academic and social integration such as classroom experience, student effort, faculty interaction, peer relationship and social involvement; and student outcome which is attainment of baccalaureate degree; and all these non-cognitive factors played significant role in a student's success such as retention at a four year institution. Strauss and Volkwein (2004) observed that the various measures of academic and social integration and growth exerted roughly the same influence among first year students at both two-year and four-year institutions.

Next, I briefly discussed the prior work accomplished on non-cognitive, cognitive and demographic variables in relation to student's academic performance.

Combining non-cognitive with cognitive and demographic variables was accurate in predicting academic success such as retention for student athletes as well as for traditional freshmen (Pickering et al., 1992). Duggan and Pickering (2008) used a number of variables on non-cognitive, cognitive, and demographic factors in relation to student's academic difficulty/ success such as grade point average measured on a scale of 4.0 and persistence to identify the students who were at risk, based on the original study by Pickering et al., (1992).This study presented evidence that non-cognitive factors could be used to predict academic success for the first year transfer students. The influence of non-cognitive variables differed depending upon whether the person was a freshman, sophomore and upper division (junior/senior) transfer student.

Finally, I wanted to include financial aid in my model and I briefly reviewed on this aspect also. Strauss and Volkwein (2002) examined financial aid and attitudes among the other variables and the result indicated that students who faced financial constraints, and received financial aid in the form of federal and state grants had higher institutional commitments leading to better academic performance than those who did not receive financial aid under similar circumstance. In the study, financial aid, though not strong, was found to be significant variable on predicting institutional commitment of a two year and four year institutions.

While a great deal of research existed regarding the impact of above mentioned cognitive, non-cognitive, demographic and financial factors on the academic performance such as retention and graduation rate of all students at four year institutions, little had been done to study the impact of those factors on the relative academic achievement such as cumulative GPA on both the groups of freshman and transfer students separately at a 4 year institution. The goal for my study was to examine whether cognitive, non-cognitive, demographic and financial aid factors could be related to cumulative GPA of both freshman and transfer students at Binghamton University, thereby identifying those students who are at risk.

The purpose of my study was to compare overall cumulative GPA of freshman students with that of transfer students. Additionally, the study compared the significant predictors based on their demographic, financial, cognitive and non-cognitive factors that influenced the cumulative GPAs of freshman and transfer students. My research questions were:

1) Does a significant difference exist between freshman and transfer students' academic achievement as measured by Grade Point Averages GPA (ranges between 0-4 scales) for all graded courses taken at the university using Parametric T-test?

2) Do cognitive (e.g., SAT scores, prior institution transfer GPA), demographic (e.g., gender, ethnicity), financial aid (e.g., received financial aid or not) and non-cognitive factors assigned as factor score using factor analysis on the likert scale Student Opinion Survey (college impression, academic experience and environment, sense of community and career services) predict the cumulative GPA of freshman and transfer students using multiple regression analysis?

Method (Design)

Instrumentation

The American College Testing (ACT) is an independent non-profit organization providing assessment, research information and program management services to the education and workforce development industries. The Student Opinion Survey (SOS) was an instrument designed by ACT to explore enrolled student's satisfaction with programs, services and other aspects of their college experience http://www.act.org. Binghamton University administered the SOS survey in April 2006 to assess student's satisfaction and the college experience at Binghamton University. Reliability and Validity information of SOS survey was given in the http://apps.airweb.org/surveys/measurequality.pdf. As mentioned in this guide, the assessment instrument had a respectable level of reliability, but reliability was much dependent how well the sample was randomly selected from the population.

I selected a few items (as shown in Appendix A) from SOS survey. Students' responses (measured on a likert scale) collected from the SOS survey were further matched with their demographic, financial aid and cognitive information extracted from students university records.

The independent/predictor variables consisted of non-cognitive variables, which were responses based on selected items in the areas of college impressions, academic environment &

facilities, sense of community, student life, career services and college environment from SOS survey (as shown in Appendix A) and consisted of demographic, financial and cognitive variables such as age gender, tuition assistance program offer etc., which were collected from student's university records (as shown in Appendix B).

The dependent/outcome variable was overall cumulative GPA a student attained at the time of the SOS survey conducted in Binghamton University.

Subjects/Participants-

The target population consisted of 10,870 degree-seeking undergraduate students, who were enrolled as freshman, sophomore, junior or senior level during Spring 2006.

A stratified random sampling was used to select sample of 3,590 students and the SOS survey was sent to this identified sample. Out of the identified sample 3,590 students, 1,228 students responded resulting in a response rate of 34%. The dataset of 1,228 records was further matched with their demographic, financial aid and cognitive information of student university records. Some of the students had missing unique identifier on the survey responses, so I was unable to match survey responses of the unique identifiers with the identifier found on the student university records and so I deleted the missing identifier records. The final dataset consisted of 1206 records, a response rate of 33.5%.

Procedures and Planned Analysis

I examined the descriptive statistics, frequency and sample size for all categorical variables such as gender, ethnicity etc. and examined the mean and sample size for each metric variables such as SAT scores, prior institution transfer GPA, etc. (as shown in Table 1), which were further sub-grouped as "Entered as Freshman" and "Entered as Transfer". Based on my

first hypothesis question, I performed a t-test analysis to examine if there was a significant difference in cumulative GPA between freshman and transfer students on academic achievement. I set level of significance at 0.05. As shown in Table 2, mean, standard deviation and p-values were reported for cumulative GPAs of the two groups "Freshman" and "Transfer" students. The difference in cumulative GPA between freshman and transfer was 0.02, difference between the two scores was insignificant with a p-value was < 0.57.

Based on second hypothesis question, I performed a multiple regression analysis to examine if any of the independent variables consisting of demographic, cognitive, non-cognitive and financial variables had statistical influence on the cumulative GPA of freshman and transfer students. In the first stage of second hypothesis question, I used multi-collinearity test to identify the highly correlated variables among the demographic, financial aid and cognitive variables because the presence of highly correlated independent variables in the model might lead to inconclusive results. In the second stage, factor analysis was performed using principal component with varimax rotation to select the factors with eigenvalues of at least 1.0 and inclusion of items to have loading of at least 0.40. In my study, the final three factors were identified as college impression and academic experience, college environment and college services. Factor score was assigned to each score. Factor score was obtained by summing raw scores corresponding to all items having loading at least of 0.40 for each factor. The goal of using varimax rotation was to minimize the complexity of the components by making the large loadings larger and the small loadings smaller within each component. In this study, the final three factors were included as non-cognitive variables in my multiple regression models 1 & 2. Finally, stepwise selection was examined for two multiple regression models, one each model for Freshman and Transfer students. Stepwise selection was preferred when the number of predictor

variables in the regression models increased and also when multicollinearity was present among the predictor variables (http://en.wikipedia.org/wiki/Stepwise_regression). In stepwise selection, the final model was achieved when no predictor variables outside the model met SLE (significance level to enter) = 0.15 and all other predictor variables passed the SLS (significance level of stay) =0.15. The default values of SLS and SLE are 0.15. Table 3 depicted the regression unstandardized, standardized coefficients and standard errors for each significant predictors for predicting undergraduate cumulative GPA of a student for the models; Model 1 showed students "Entered as Freshman" and Model 2 showed students "Entered as Transfer". I set the significance level at 0.05. Based on the multicollinearity test and criterion used in the factor analysis, fewer variables were selected in the multiple regression models (as shown in Table3). R-square value increased as the number of variables increased in the model, so I considered adjusted R- square value to summarize the overall fitness of the model. R-squared is defined as the percentage of variability of the outcome variable cumulative GPA, that was explained by the predictors in models.

Results and Analysis

Table 1 here

As shown in Table 1, freshman (N= 917) and transfer (N = 289), the percentage of nominal variables such as gender, fulltime/part-time, in-state/out-of-state and ethnicity were almost the same for freshman and transfer respondents. The percentage of females for freshman and transfer were 58.5% and 62.4% respectively and were higher than the males in both the groups. The full-time students for freshman and transfer were 100% and 100% respectively and the respondents were mostly from in-state with 91.3% freshman and 92.7% transfer respondents. The largest percentage of respondents was white 54%-59% approximately followed by Asian

12.4%-15.9% and then Black 3.1%-3.9% for freshman and transfer respondents. All the respondents were degree-seeking in both freshman and transfer category. The largest percentage of freshman respondents entered Binghamton University with student status as “Freshman” and “Sophomore” but largest percentage of transfer respondents entered Binghamton University with student status as “Sophomore” and “Junior” based on the credit hours transferred by the prior institution or attained at Binghamton University. Approximately, 56%-57% of the respondents received financial aid in both the groups. Mean age of transfer students were slightly greater by 2.3 years than the freshman students. Freshman students had a mean SAT combined score of 1239 measured on a total score of 1600 point section (Mathematics and Verbal), and transfer students had a mean 3.30 GPA measured on a scale of 4.0 from prior institution.

Table 2 here & Table 3 here

Based on research question 1, the difference in cumulative GPA between freshman (M=3.19, SD=0.45) and transfer (M=3.17, SD=0.51) students was 0.02. Testing the equality of variances, F (285,914) = 1.13, p-value=0.18, indicating that the variances were equal in both the groups of freshman and transfer students. Considering that the variances were equal, the differences in cumulative GPA between freshman and transfer respondents was statistically insignificant, t(1199) = 0.57, p-value 0.58. But if we look at the table3, there is a significant difference between in scores between the freshman seniors and transfer seniors.

Table 4 here

Based on research question 2, the final multiple regression Model 1 (students entered as Freshman) and Model 2 (students entered as Transfer) were shown in Table 3, which displayed unstandardized coefficients (B), standardized regression coefficients (β), standard error of unstandardized coefficients (SE (B)) and adjusted R-squared. The models for predicting

cumulative GPA for freshman, F (9,877) =38.96, $p < 0.0001$ and transfer, F (8,203) = 6.99 and $p < 0.0001$ were statistically significant. The adjusted R-squared for Model 1 (Entered as Freshman) was 0.27, indicating that 27% of the variance of the outcome variable cumulative GPA can be accounted by the predictors in the model 1. The adjusted R-squared for Model 2 (Entered as Transfer) was 0.18, indicating that 18% of the variance of the cumulative GPA could be accounted by the predictors in model 2. The unstandardized regression coefficients described the strength and direction of the relationship between each predictor and the outcome variable cumulative GPA. Standardized regression coefficients would determine the relative influence of each predictor on the outcome variable cumulative GPA.

Demographic Variables- The demographic variables such as gender, age, Hispanic, senior were significant predictors in Model 1 at 0.05 level. The unstandardized coefficient for male is -0.19, indicating that, on average, cumulative GPA of male was 0.19 lower than that of female after controlling the other variables in the model 1. Similarly, the unstandardized coefficient for age was -0.03, indicating that increase of one year of age, cumulative GPA decreased by 0.03. The standardized regression coefficient for age was -0.07, gender was -0.20.

In model 2, none of the demographic variables are significant.

Cognitive variables- In model 1, variables AP credits and SATC score were significant predictors and in model 2, variables AP credits and Transfer GPA (from prior institution) were significant predictors. The variable transfer GPA had the highest influence on cumulative GPA in model 2, indicating that transfer students with higher prior institution GPA had probability of getting higher cumulative GPA in a 4 year university.

Non-Cognitive variables- In the models 1, college impression & academic experience factor were significant. In model2, none of the non-cognitive variables were significant.

Financial Aid- None of the financial aid variables was significant in model 1and model 2.

Discussion and Conclusion

Based on hypothesis question1, overall there was no statistically significant difference in cumulative GPA between freshman and transfer students, but comparing cumulative GPA at student level, freshman seniors scored 0.14 higher than senior transfer students and the difference was statistically significant. So the question was if the difference was meaningfully significant? To answer this question, we need to know the diverse culture and social background of transfer students. These students were more likely to attend a community college because of low tuition costs and less competition than to going to a 4 year institution (Sara Goldrick-Rab et al., 2009). Alfred Herrera, assistant vice provost at the University of California explained that one of the goals of higher education was to prepare students to compete and perform well in the real world. He also added that welcoming students from a variety of areas- geographic, cultural, ethnic, age was a critical factor in that preparation (Handel, 2011). So supporting the process of admission and enrollment of transfer students at Binghamton University or any other 4 year institution should be one of the primarily objectives for giving an equal opportunity to any student coming from a diverse background to get their baccalaureate degree.

My study presented evidence that college impression & academic experience, which involved overall impression of the quality of education at this college, satisfaction level at this college in general, meeting faculty inside and outside the classroom etc., was the most significant variable for freshman students. The results of my study were consistent with the findings of Tinto (2005) in arguing that institutional experiences, academic integration and outcome played a significant role in a student's success at a four year institution. Administrators should consider a range of success strategies like developing high quality teaching and instruction, providing

quality vocational and pre-requisites programs, creating positive college environment, mentoring and tutoring services etc.to prepare the freshman and transfer students to achieve the desired outcome of timely graduation and better cumulative GPA at Binghamton University.

Cognitive variables such as SAT scores, AP credits and prior institution transfer GPA, demographic variables such as gender, ethnicity, declaring their major or not and student level were the significant cognitive and demographic indicators, which increase the ability to predict students cumulative GPA. Townsend et el. (1993) also examined demographic and cognitive variables and found that community college GPA was the significant predictor of university academic success and degree persistence which is consistent with the findings of my study. It is found that students declaring their majors and as well having senior status scores slightly better than freshman, sophomore and juniors.

The limitation of the study was that the survey was conducted during the spring 2006 and so the behavior and perception of freshman and transfer students towards their academic experience and environment might have changed during the last few years and so the latest data of Student Opinion Survey might be considered for identifying the key significant indicators for higher cumulative GPA. The sample size of transfer students was less as compared to freshman and so in the future this study should be tested with larger sample size for both freshman and transfer students. My study findings should also be tested with other similar kinds of setting such as public and research 4 year institutions.

Services such as tutoring and mentoring have been started at our doctoral institution to help and mentor the academically weak students. Identifying the significant variables influencing overall cumulative GPA for freshman and transfer students can help us to come up with more effective strategies to prepare the ongoing incoming freshman and transfer students in the future.

References

Carlan, P.E., & Byxbe, F.R. (2000). Community Colleges under the Microscope: An Analysis of Performance Predictors for Native and Transfer Students. *Community College Review, 28(2),* 27-42.

Cejda, B.D., Rewey, K.L., & Keylor, A.J. (1998). Transfer shock in academic discipline: The relationship between students' majors and their academic performance. *Community College Review, 26 (3),* 1-13

Duggan, M. H., & Pickering, J. W. (2008). Barrier to transfer students' academic success and retention. *Journal of College Student Retention, 9(4),* 437-459

Eimers, M., & Mullen, R. (1997). Transfer students: Who are they and how successful are they at the University of Missouri? *College and University: The Journal of the American Association of Collegiate Registrars, 72,* 9-20.

Glass, J. C., Jr., & Harrington, A. R. (2002). Academic performance of community college transfer student and "native" students at a large state university. Community College Journal of Research and Practice, *26(5),* 415-430.

Graham, S. W., & Dallam, J. (1986). Academic probation as a measure of of performance: Contrasting transfer students to negative students. *Community/Junior College Quarterly of Research and Practice, 10,* 23-34

Handel, J. (2011). Improving Student Transfer from Community Colleges to four year institutions- The perspective of leaders from baccalaureate granting institutions. (Retrieved July, 2011 from College Board. www.collegeboard.org)

Hoyt, J. E., & Winn, B. A. (2004). Understanding retention and college student bodies: Differences between drop-outs, stop-outs, opt-outs, and transfer-outs. *NASPA Journal, 41*(*3*), 395-417.

Nolan,E.J., & Hall, D.L.(1978). Academic performance of the community college transfer student: A five-year follow-up study. *Journal of College Student Personnel, 19,* 543-548.

Pickering, J. W., Calliotte, J. A., & McAuliffe, G. J. (1992). The effect of noncognitive factors on freshman academic performance and retention. *Journal of the Freshman Year, 4*(2), 7-28.

Sara Goldrick-Rab, Douglas N. Harris, Christopher Mazzeo, and Gregory Kienzl (May 2009). *Transforming America'sCommunity Colleges: A Federal Policy Proposal to Expand Opportunity and Promote Economic Prosperity*. Metropolitan Policy Program at Brookings, p. 10. (Retrieved April 1, 2011, from http://www.brookings.edu/reports/2009/0507_community_college_goldrick_rab.aspx)

Struss, C. J., & Volkwein, J. (2004). Predictors of Student Commitment at two-year and four-year Institutions. *Journal of Higher Education, 75 (2),* 203-227

Tinto, V., Goodsell, A., & Russo, P. (1993). Building community among new college students. Liberal Education, *79(4),* 16-21.

Tintoo, V. (2005). College student retention formua for success. In Seidman, A. (Ed,), Rowman & Little-field Publishers, http:// www. ean-edu.org/news/20020619b.sktml

Towsend, B. K., McNerny, N., & Arnold, A. (1993). Will this community college student succeed? Factors affecting transfer student performance. *Community College Journal of Research and Practice, 17,* 433-443.

Table 1 *Descriptive Statistics of Cognitive, Demographic and Financial Aid Variables*

Variable	Variable Type	Statistics	Freshman	Transfer
Gender	Nominal Variable	N (%)	Male = 380-(41.5%) Female = 537(58.5%)	Male= 109 (37.6%) Female = 180(62.4%)
FTPTIND	Nominal Variable	N (%)	Fulltime= 917(100%)	Fulltime= 289 (100%)
In_state	Nominal Variable	N (%)	Instate=837 (91.3%) Outstate= 80(8.7%)	Instate=268 (93.1%) Outstate=21(6.9%)
Ethnicity	Nominal Variable	N (%)	American Indian=1(0.1%) Asian = 151(16.4%) Black = 38(4.1%) Hispanic = 45(4.9%) NRA =8(0.9%) Unknown= 175(19.1%) White =499(54.4%)	American Indian= 0(0%) Asian = 38(13.5%) Black =9(3.1%) Hispanic =9 (3.1%) NRA = 5(1.7%) Unknown = 57(19.7%) White = 171(59.2%)
Stud_level	Nominal Variable	N (%)	Freshman=92(10.0%) Sophomore=253(27.6%) Junior=217(23.7%) Senior=355(38.7%)	Freshman=20(6.9%) Sophomore=41(14.2%) Junior=79(27.3%) Senior=149(51.6%)
Deg_seek	Nominal Variable	N (%)	Degree seeking= 917 (100%)	Degree seeking=289(100%)
Offcamp	Nominal Variable	N (%)	Offcampus=276(30.1%) Incampus=641(69.9%)	Offcampus=153(52.9%) Incampus= 136(47.1%)
rcvdaid	Nominal Variable	N (%)	Yes-526 (57.4%) No-391(42.6%)	Yes-164(56.7%) No-125(43.1%)
Tapoffer1	Nominal Variable	N (%)	Yes-455(49.6%) No-462(50.4%)	Yes-149(51.6%) No-140 (48.4%)
Ap_credits	Nominal Variable	N (%)	Yes-599(65.3%) No-318(34.7%)	Yes-56(19.4%) No-233(80.6%)
Ugcumhrs	Metric Variable	N Mean	N=917 Mean=74.0	N=289 Mean=85.4

ugcumgpa	Metric Variable	N Mean	N=915 Mean=3.19	N=286 Mean= 3.17
aidacpt	Metric Variable	N Mean	N=917 Mean=7165	N=289 Mean= 8113
Age	Metric Variable	N Mean=	N=917 Mean=20	N=289 Mean=23
SATC	Metric Variable	N Mean	N=889 Mean=1239	N=109 Mean=1178
Transgpa	Metric Variable	N Mean	NA	N=218 Mean=3.3
Transfer credit hrs	Metric Variable	N Mean	N=917 Mean=5.3	N=289 Mean=50.4

Table2. *Comparison of cognitive factors between Freshman and Transfer students*

Cognitive Variable	Freshman		Transfer		Difference	p-value
	Mean	SD	Mean	SD		
1) Cum. GPA	3.19	0.48	3.17	0.51	0.02	0.57

p-value <0.05 *, SD = standard deviation

Table3. *Comparison of cognitive factors between Freshman and Transfer students by student level*

Cognitive Variable by Student Level	Freshman		Transfer		Difference	p-value
	Mean	SD	Mean	SD		
Cum. GPA (Freshman)	2.83	0.54	3.01	0.78	0.18	0.36
Cum. GPA (Sophomore)	3.08	0.53	3.11	0.42	0.03	0.75
Cum. GPA (Junior)	3.21	0.42	3.18	0.56	0.03	0.64
Cum. GPA (Senior)	3.34	0.38	3.2	0.46	0.14	0.001*

Table4 *Multiple Regression Models for Freshman and Transfer students for the outcome dependent variable cumulative GPA*

	Freshman Students (Model 1)			Transfer Students (Model 2)		
Variables	B	SE(B)	β	B	SE(B)	β
Intercept	2.01	0.39		0.12	0.42	
Male	-0.19**	0.03	-0.20	-	-	-
Senior	0.17**	0.04	0.12	-	-	-
Declared_major	0.17**	0.04	0.15	-	-	-
Age	-0.03	0.02	-0.07	0.01	0.006	0.11
Hispanic	-0.26**	0.06	-0.01	-0.32	0.20	-0.1
Ap_credits	0.15**	0.03	0.15	0.27*	0.09	0.12
Satc	0.001**	0.00011	0.27	-	-	-
Transgpa	-	-	-	0.46**	0.09	0.34
College impression & acad experience	0.02**	0.003	0.21	0.008	0.005	0.09
Adjusted R-squared	0.28			0.19		

Note: B = unstandardized regression coefficient estimates, SE B= standard error of unstandardized regression coefficient, β = standardized regression coefficient, R-squared = Coefficient of Determination; *p < 0.05. **p < 0.01

Appendix A *Description of Predictor (Non-Cognitive) Variables included in the Regression Models*

Variable	***Survey Question***	***Coding Scheme(Likert Scale)***
College Impressions		
Plantograd	Is your current plan to graduate from this college?	5= Definitely yes 4= Probably yes 3= Uncertain 2= Probably no 1= Definitely no
Qual_edu	What is your overall impression of the quality of education at this college?	5= Vey High 4=High 3= Average 2= Low 1= Very Low
General	How satisfied are you with this college in general?	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Academic environment, experiences and facilities		
Avl_intern	Availability of internships	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Satacad	How frequently have you been satisfied with your academic experiences at this college?	5= Very frequently 4= Frequently 3=Sometime 2= Rarely 1= Never
Meetfacout	How frequently have you had discussions, meetings, or conversations with instructors outside of class?	5= Very frequently 4= Frequently 3=Sometime 2= Rarely 1= Never
Groupwork	How frequently have you worked with other students on class assignments?	5= Very frequently 4= Frequently 3=Sometime 2= Rarely 1= Never
disruptlrn	How frequently have you experienced classroom behavior by other students that was disruptive to learning?	5= Very frequently 4= Frequently 3=Sometime 2= Rarely

		1= Never
Sense of Community		
Belong	Your sense of belonging to campus	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Noharass	Freedom of harassment on campus	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Facrespt	Faculty respect for students	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Rules	Clarity of rules for student conduct	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Student Life		
subsabus	Educational programs regarding alcohol and substance abuse	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Aslt_pgms	Sexual assault prevention programs	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
orient	New student orientation	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Career Services		

Career_srv	Career planning services	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Job_srv	Job placement services	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
Soc_support	Your social support network on campus	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
arts	Cultural programs	5= Very satisfied 4= Satisfied 3= Neither Satisfied nor dissatisfied 2= Dissatisfied 1= Very dissatisfied
College Environment		
Prjudc_act	Acts of prejudice are rare on this campus	5= Strongly agree 4= Agree 3= Neither agree nor disagree 2= Disagree 1= Strongly disagree
mentor	I have developed a mentoring relationship with a faculty/staff member	5= Strongly agree 4= Agree 3= Neither agree nor disagree 2= Disagree 1= Strongly disagree
Advise_avl	Academic advising is available to me when I need it	5= Strongly agree 4= Agree 3= Neither agree nor disagree 2= Disagree 1= Strongly disagree
openness	I have developed an openness to the opinion of others	5= Strongly agree 4= Agree 3= Neither agree nor

		disagree 2= Disagree 1= Strongly disagree
goals	The college has helped me meet the goals I came here to achieve	5= Strongly agree 4= Agree 3= Neither agree nor disagree 2= Disagree 1= Strongly disagree
value	Comparing the cost to the quality of education , this college is a good value	5= Strongly agree 4= Agree 3= Neither agree nor disagree 2= Disagree 1= Strongly disagree
Tuff_fin	It has been difficult to finance my education	5= Strongly agree 4= Agree 3= Neither agree nor disagree 2= Disagree 1= Strongly disagree

Appendix B *Description of Predictor Variables (Cognitive, Demographic and Financial Aid Included in the Regression Models*

Variable	Description	Coding Scheme
Gender	Sex of a student	If sex= M then male=1 or else male=0;
Age	Age of a student	It ranges between 18-55 years
FTPTIND	Student enrolled as Fulltime or Part-time	If FTPTIND= F then fulltime=1 or else fulltime=0;
In_state	If a student is from In-state or Out-state	If student is from instate then In_state=1 or else in_state= 0;
Ethnicity	Ethnicity of a student	If ethnicity = "White" then white=1 or else 0; If ethnicity="Asian" then Asian=1 or else0; If ethnicity="black" then black=1 or else 0; If ethnicity="Hispanic" then Hispanic =1 or else 0; If ethnicity="American Indian" then amind= 1 or else 0; If ethnicity= "Non-Resident Alien" then nra=1 or else 0; If ethnicity= "Unknown" then unknown=1 or else 0;
Underrep	If a student's ethnicity is "Black", "American Indian" or "Hispanic" then student is classified as underrepresentative	If a student is underrep then underrep= 1 or else 0
Stud_level	Student is given stud_level status based on their undergraduate credit hours for the current semester	If stud_level in "Freshman" then freshman= 1 or else 0; If stud_level in "Sophomore" then sophomore=1 or else 0; If stud_level in "Junior" then junior=1 or else junior=0; If stud_level in "Senior" then junior=1 or else junior=0;
Deg_seek	If a student is degree seeking or not	If a student is degree-seeking then deg_seek= 1 or else 0;
Offcamp	If a student lives in offcampus or not	If a student is in offcampus then offcampus=1 or else 0;
rcvd	If a student did receive financial aid or not	If student received financial aid then rcvd=1 or else 0;
aidacpt	The aid amount accepted by the student	It ranges between 0-35,206 $

ugcumhrs	Cumulative hours obtained by the student	It ranges between 0-218 hours
Ap_credits	If a student has AP credits or not	If student received AP credits then ap_credits=1 or else 0;
satc	SAT(Math) + SAT(Verbal) = SAT(Combined)	It ranges between 710 to 1540
transgpa	Transfer GPA transferred by the transfer student from prior institution	It ranges between 2.14 - 4.0 scale
ugtrnhrs	Transfer credit hours transferred by the transfer student	It ranges between 0 to 103 credit hours
ugcumgpa	Undergraduate cumulative GPA based on the last semester the student attended Binghamton University	It ranges between 1.42 – 4.0 scale.
grad	If a student graduated or not	If student graduated then grad=1 or else grad=0;
firstchoice	If a student's preference to Binghamton was first choice or not	firstchoice= 1 or else 0;
Tapoffer1	If a student is granted Tuition Assistance Program	If a student receives tapoffer1 then tapoffer =1 or else 0;

An Institutional Model for Degree Completion: A *Moneyball* Approach.

By

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Introduction

At the turn of the twenty-first century, the Oakland Athletics revolutionized the way baseball players were evaluated by moving away from conventional measures (e.g., batting average, runs batted in, and home runs) to measures that would increase a team's chances of winning (e.g., on-base percentage and slugging percentage). By understanding the rules (the team with the most runs wins), the Oakland Athletics used data effectively to win games in a more efficient manner (i.e., spending less money). This *Moneyball* (Lewis, 2003) approach allowed Oakland to compete against more expensive teams like the New York Yankees and Boston Red Sox, even though their payroll was remarkably smaller.

With public funding decreasing for higher education and an increasing demand for accountability with regards to degree completion, institutions need to become more efficient and effective in graduating students. Most institutions already collect and report institutional data to the federal government in order to be eligible for federal monies (e.g., Integrated Postsecondary Education Data System [IPEDS]). Institutions also collect and track data to ensure records are properly and accurately maintained for their day-to-day operations. The issue is not whether institutions collect enough data, but instead whether institutions are using already collected data effectively and efficiently, especially with respect to graduation.

For example, institutions must report one-year retention rates to IPEDS and theoretically having high retention rates should lead to high graduation rates. Yet, just reporting retention rates does not capture if students who are being retained actually have a chance to graduate or if they are being retained but really have no chance of being eligible to graduate (i.e., students who are retained from one year to another but have a grade-point-average (GPA) less than one). As the cost of higher education continues to increase, retaining students who have little to no chance of earning a credential while accumulating a large sum of debt becomes troublesome.

By combining data already collected, institutions can more accurately predict graduation rates. Examining metrics such as retention and GPA, institutions can develop better measures (i.e., retention to graduation rate – which examines the retention rates by first semester GPA) to do so. Understanding these breakdowns allows administrators and faculty members to develop better policies and programs that are more effective. For example, if a large number of students are not being retained because of low GPA, administrators and faculty members may examine what courses are contributing to their poor academic performance. The purpose of this research, therefore, is to develop a model for degree completion from an institutional perspective. By having such a framework, institutional researchers and administrators may be better able to develop and evaluate measures, policies, and programs that can improve the graduation rates at their institutions.

Literature review

The field of higher education has been guided by many influential frameworks such as input-environment-outcomes models including Terenzini and Reason's (2005) *Comprehensive Model of Influences on Student Learning and Persistence* and sociological models such as Tinto's (1993) *Longitudinal Model of Institutional Departure*. This allows prominent and important concepts such as academic and social integration (Tinto, 1993) or student engagement (Kuh, Kinzie, Schuh, Whitt, & Associates, 2003) to guide an institution's assessment practices and policies, especially with regards to learning outcomes. Through their review of higher education research, Pascarella and Terenzini (2005) found social and academic involvement are positive influences on student persistence, but the "findings are inconsistent and the causal linkages remain obscure" (p. 440). One possible explanation for these inconsistent and causal linkages is that institutions rarely deny students their degree because of their involvement or engagement levels. If students meet certain academic requirements, the institution will more than likely award them a degree regardless of their level of involvement with professors (e.g.,

conducting undergraduate research) or extracurricular activities (e.g., participating in student organizations).

Instead of examining retention and graduation from a student perspective, we propose an institutionally focused model based upon the requirements that students need to satisfy in order to graduate from the university. At most higher education institutions, these graduation requirements are: 1) achieve a certain cumulative GPA and accumulate a certain number of credits in a specified curriculum, 2) pay tuition, and 3) do not commit any acts of extreme social or academic deviance (e.g., selling drugs, assaulting classmates, plagiarism). This model, thus, allows institutional researchers to easily operationalize variables with data already collected by the registrars and student aid offices. More importantly, the results can inform administrators of tangible actions that they can more easily act upon. Administrators, for example, can review and assess a fee policy to examine whether it is placing undue hardships for those least able to afford them (e.g., adding a convenience fee for those paying their tuition by credit card) and then change it.

Data Sources and Methodology

For this study, we examined longitudinal student records and financial data for first-time, full-time, baccalaureate-seeking students who started in the summer or fall 2004 (N = 12,212 students) at a large public Mid-Atlantic Research I University and its regional campuses. The student record data (first-year cumulative GPA, initial campus, last semester of attendance, graduation indicator) for the 2004 cohort was obtained through the institution's data warehouse. The financial information (total federal aid[1], total state aid, total institutional aid[2], total private aid[3], total aid[4], cost of attendance, and income[5]) was provided by the institution's Office of Student Aid. Using this information, we derived the net cost

[1] This includes veteran's benefits.
[2] This includes University scholarships, University grants and University fellowships.
[3] This includes private loans, external scholarships, and loans
[4] Total aid is the sum of total federal aid, total state aid, total institutional aid, and total private aid.
[5] Income calculated by the federal processer and based on FAFSA.

of attendance (NCOA) by calculating the difference between the cost of attendance and total aid awarded. The financial aid and family income information was available only for students who completed the Free Application for Federal Student Aid (FAFSA). The student record information was retrieved for all semesters starting from summer 2004 to spring 2010 (a six-year timeframe), while financial information was collected based on an academic year timeframe from 2004-05 to 2009-10.

To operationalize the proposed model, these analyses focused on academic performance, family income, and NCOA (i.e., cost of attendance minus financial aid received) on graduation because as long as a student meets the academic guidelines of a major (i.e., meets a certain GPA requirement and obtains the required number of credits in a prescribed curriculum) and pays tuition, she/he will generally earn a degree from her/his institution. In developing this model, our focus shifts from examining the influence of financial aid, which includes loans, grants, and work-study, to examining the influence of NCOA on graduation. Financial aid is important because it lowers the NCOA, however, if the student cannot afford to pay the NCOA, he or she cannot be enrolled. Due to the sensitivity and accessibility of whether a student was dismissed because of social and academic deviance, this factor was omitted from these analyses. We do recognize that this does occur but it is generally the exception and not the rule.

For this study, we defined academic performance as the cumulative GPA at the end of the first academic year. In the 2004 cohort, 107 students did not have a cumulative GPA at the end of their first academic year. These students are included in the descriptive tables, but omitted from the logistic and ordinary least-squares (OLS) regression analyses. A student's family income level was determined by the median of the supplied income values obtained from the Free Application for Federal Student Aid (FAFSA) applications during the six-year timeframe. Only 16.6 percent or 2,025 students of the 2004 cohort did not file the FAFSA at least once during the examined time period. For the descriptive tables supplied in the report, family income was binned according to the 2004 quintiles set by federal

guidelines (Tax Policy Center, 2011); however, for the logistic and OLS regression analyses, the family income variable was kept continuous (units = per ten thousand dollars). To prevent the exclusion of the students whose family income was unknown from logistic and OLS regression analyses, a dichotomous variable was created to indicate whether the student completed the form at least once (1 = filed form at least once; 0 = never filed a FAFSA form). Another variable was then created by calculating the product of the dichotomous variable and the family income variable. Models were then created utilizing the dichotomous variable and the modified family income variable to gauge the influence of family income on graduation and cumulative GPA without having to omit students from the analyses.

We utilized descriptive statistics (e.g., frequencies, rates), logistic regression, and OLS regression to examine the relationships between academic performance, family income, NCOA for the first year, and six-year graduation rates. For the logistic regression models, we modeled the influence of academic performance, family income, and NCOA on whether students graduate or not. The OLS regressions modeled the influence of family income and NCOA for the first year on academic performance.

We created separate logistic and OLS regression models for each of the family income quintiles[6] because we hypothesized that the NCOA might have differing effects at various family income levels. For example, a NCOA of $10,000 for a family with a combined income of $18,000 could have a more severe consequence than for a family with a combined income of $88,000. Due to the limitations of the data and the varying residential statuses of the campuses, which have a subsequent influence on cost of attendance (i.e., students who reside on campus have a higher cost of attendance compared to students who commute[7]), the analyses were further disaggregated in the following fashion: 1) Flagship Campus (the majority of first-year students are required to reside on campus), 2) Residential Regional Campuses

[6] For the sake of readability, this report uses the following labels: lowest quintile (less than $18, 486), second-lowest quintile ($18,487 to $34, 675), middle quintile ($34,676 to $55, 230), second-highest quintile ($55,231 to $88,002), and highest quintile (more than $88, 002).

[7] A limitation of the NCOA variable was that it did not include the costs incurred by commuter students living off-campus (e.g., rent).

(students have the option to reside on campus during their first year), and 3) Nonresidential Regional Campuses (all students commute to campus).

The strength of this study is that it utilizes population data to confirm the validity of the proposed model; yet, this is also a weakness as the generalizability of the results are limited to a single institution/system. More research needs to be conducted in order to examine whether the results are generalizable to other types of institutions (e.g., two-year institutions, private, for-profit).

Results

Table 1 provides the six-year graduation rates for all 2004 first-time, full-time, baccalaureate-seeking students who started in the summer or fall 2004 disaggregated by family income and 2004-2005 cumulative GPA. Regardless of where a student starts at the University, students who performed better academically at the end of the first-year were more likely to graduate than those who perform poorly. The data also suggested that students from families with higher incomes were more likely to graduate than those students from poorer families. The logistic regression models (Table 2) found that for every one point increase in the cumulative GPA, a student increased her/his odds of graduating within six years by 4.49. In other words, a student with 3.0 cumulative GPA at the end of her/his first academic year had a 349 percent higher chance of graduating than a student with a 2.0 cumulative GPA. First-year cumulative GPA was a stronger predictor than family income. For every $10,000 increase in total family income, a student's odds of graduating increased by 1.06. Assuming a gap of $70,000 between the lowest and the highest family income, a student in the highest family income level would have a 50 percent [8] higher chance of graduating than a student from the lowest family income level. Overall the final model that included both first-year cumulative GPA and family income increased the percent predicted correctly by 8 percent compared to the null model (i.e., a model with no variables) and had a Nagelkerke R^2 of .306.

[8] This is calculated by (1.06)^7 = 1.50, where 1.06 is the odds ratio and 7 equates to 70 thousand.

University-wide, 22 percent of students had a NCOA greater than $20,000 (Table 3); however, the majority of these students were in the highest family income quintile. The mean (average) NCOA for all students was about $12,800 while the median (midpoint) was $12,600. Flagship Campus students had a higher mean NCOA ($15,200, see Table 4) than Residential Regional Campus students ($10,900, see Table 5) and Nonresidential Regional Campus students ($9,400, see Table 6). At the Flagship, 37 percent of the students had a NCOA greater than $20,000, whereas only 12 percent of Residential Regional Campus students and 2 percent of Nonresidential Regional Campus students had a NCOA greater than $20,000.

At the Flagship Campus (Table 7), with the exception of the students in the lowest family income quintile, for every increase of $10,000 in the NCOA, a student's chance of graduating decreased (odds ratio for the other income quintiles ranged from .72 to .96). The findings for the Residential Regional Campuses were relatively inconsistent. For students in the lowest, middle, and second-highest quintile, when the NCOA increased, the odds of graduating decreased; whereas, for the students in the second-lowest and highest-quintile, the odds of graduating increased as NCOA increased. These inconsistent results may be explained by the model's lack of a control variable for whether a student resided on campus or not. Except for students in the highest family income quintile (where NCOA had no effect on whether a student graduated or not), students at Nonresidential Regional Campuses had a lower chance of graduating as their NCOA increased. The effects did appear to vary among the family income levels as the students in the middle family quintile had the greatest effect (odds ratio of .62), while students in the second-lowest quintiles had the smallest effect (odds ratio of .90). Within all models, regardless of where a student starts at the University, first-year cumulative GPA was the strongest predictor of whether a student graduated or not. Overall, the addition of these two variables into the model increased the percent predicted correctly compared to the null model.

To examine whether any moderating effects existed between cumulative GPA and family income level, family income level was regressed on cumulative GPA (Table 10), controlling for total SAT. The models suggested that family income had little effect per $10,000 on a student's cumulative GPA (b-weight = .01) regardless of where a student started at the University. If we assume a $70,000 difference between the lowest family income quintile and the highest family quintile, a student in the highest family income quintile would have a .07 higher cumulative GPA than a student in the lowest family income quintile. The practical insignificance of the relationship between cumulative GPA and family income level suggests that the two variables might be mutually exclusive, which itself was an important finding. This finding indicates that even though family income and cumulative GPA were significant predictors of graduation, the effects of each variable were relatively independent of the other.

We also examined the relationship between cumulative GPA and NCOA. At the Flagship Campus, the NCOA had a negligible effect on a student's cumulative GPA (Table 11) as the b-weights ranged from -.01 for students who did not complete a FAFSA to .07 for students in the lowest quintile. The positive b-weight for the lowest family income quintile might suggest that support and programs to help these students academically at the Flagship Campus are effective. The effects were more substantial for students at the Regional Campuses regardless of whether the campuses had housing or not (Table 12 and Table 13). The b-weights ranged from -.25 to .11. A negative b-weight meant that as NCOA increased a student's cumulative GPA decreased. A concern is that the larger negative effects on cumulative GPA involved students in the second-lowest and middle quintile for Residential Regional Campus students. The negative effects were relatively large for all groups of Nonresidential Regional Campus students except for those in the highest family quintile. Utilizing the largest negative b-weight (-.25 for the middle family income quintile for Residential Regional Campus students) and assuming a NCOA of $20,000, this would correspond to a decrease in cumulative GPA of .5. Even though NCOA had practical significance, the variable explained 2.5 percent or less of the variance in cumulative GPA.

Lastly, we developed a regression model to examine the relationship between the time spent enrolled at the University and cumulative GPA and NCOA (Table 14) for students who did not graduate within six years (n = 3,639). Cumulative GPA had a positive effect on time spent enrolled (b-weight = .24) in that the higher the cumulative GPA, the more time a student who would not graduate within six years spent enrolled at the University. The NCOA, conversely, had a negative effect on time spent enrolled (b-weight = -.13), so if the student had a larger NCOA, she/he spent less time enrolled at the University.

Conclusions

Utilizing data on first-time, full-time, baccalaureate-seeking students who started in the summer or fall 2004, the current analyses find that academic performance (first-year cumulative GPA), family income, and NCOA are important predictors of graduation, validating the proposed model. An important finding is that the effects of cumulative GPA and family income on graduation are relatively independent of each other. Based on these findings, we posit that students from families with higher incomes are more likely to graduate than students from poor families, at least in part because they can afford the NCOA and persist to complete their degree requirements even in the face of poor academic performance. In examining the influence of NCOA on graduation, we find that it has differing effects at different family income levels. The findings mostly suggest that for students with less financial means, when NCOA increases, the influence on graduation and cumulative GPA is more negative than it is for students with more financial means. We also find that for non-graduates in the 2004 cohort, the higher the NCOA, the less time they spend enrolled.

Understanding that paying tuition is necessary for a student to graduate provides a more plausible explanation for the graduation gaps between the varying family income levels and leads to the following hypothesis of success: The longer you are able to play the game, the more likely you are to succeed. This hypothesis is better illustrated with Mid-Atlantic Research I University students who have gone to non-degree status because of poor academic performance. Students who are dropped to this

status can continue attending the University for up to 30 credits as long as they earn at least a 2.01 GPA in any semester attended in non-degree status. This period is an opportunity for students to pull their cumulative GPA up to a level that allows them to be academically eligible to enter a major. Unfortunately, students in this status are ineligible for financial aid. Thus, students from families with high income who have entered this status can remain at the University because they have the resources to continue to pay the tuition, thereby having an opportunity to become eligible academically. Without financial aid, students from poor families may depart because they cannot afford the tuition to continue. Based on this logic, we hypothesize that the primary reason for the graduation gap that exists between the varying family income levels is simple: the wealthy have more financial resources than the poor, allowing them to remain enrolled until they graduate. Money then essentially buys time.

Maintaining a certain cumulative GPA may also have financial implications for some students. Even though our models suggest that academic performance and family income are relatively independent of each other, we do think a real-world relationship exists between the two. Anecdotally, many students cite financial concerns as their reason for leaving the University without completing a degree. We hypothesize that in some cases the cause of their financial distress may be their failure to maintain a certain cumulative GPA, which in turn prevents them from qualifying for certain forms of aid.

By having such a model, institutional researchers and administrators may be better able to develop and evaluate measures, policies, and programs that can improve the graduation rates at an institution. This model purposefully focuses on graduation; however, the difficulty in implementing strategies towards graduation is the time needed to assess the effectiveness and efficiencies of such plans (e.g., we need six years to see if graduation rates improve from cohort to cohort). Understanding the importance of academic performance and degree completion allows institutional researchers to develop *Moneyball* (Lewis, 2003) measures that are timelier than waiting six years to examine whether a student completed a degree or not. One such measure is monitoring the percentage and number of

students who earn a cumulative grade-point-average below 2.0 in their first year. The 2.0 cut-off is important at the University, because students cannot enter a major or graduate with a cumulative grade-point-average below it. Other hardships could also be incurred, such as a student entering into non-degree status, which prevents them from receiving federal student aid. This, then, becomes a more useful and timelier indicator to measure the effectiveness of programs that are geared towards improving graduation rates.

References

Kuh, G. D., Kinzie, J., Schuh, J. H., Whitt, E. J., & Associates. (2005). *Student success in college: Creating conditions that matter.* San Francisco, CA: Jossey-Bass.

Lewis, M. (2003). *Moneyball: The art of winning an unfair game.* New York: NY: W.W. Norton & Company Inc.

Pascarella,E.T. & Terenzini, P.T. (2005). *How college affects students.* San Francisco, CA: Jossey-Bass.

Tax Policy Center: Urban Institute and Brookings Institution (2011). Household Income Quintiles 2000-2009. Retrieved March 1, 2012, from http://www.taxpolicycenter.org/taxfacts/displayafact.cfm?Docid=330.

Terenzini, P. T., & Reason, R. D. (2005, November). *Parsing the first year of college: Rethinking the effects of college on students.* Paper presented at the meeting of the Association for the Study of Higher Education, Philadelphia, PA.

Tinto V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd. Ed.). Chicago, IL: University of Chicago Press.

Table 1: 2004 Cohort Six-Year Graduation Rate by Family Income and 2004-2005 Cumulative GPA: University Wide

Income	Total Students		2004-2005 Cumulative GPA													
			No GPA		<1.00		1.00-1.99		2.00-2.49		2.50-2.99		3.00-3.49		3.50-4.00	
	n	6-year Grad Rate	n	6-year Grad Rate	n	6-year Grad Rate	n	6-year Grad Rate	n	6-year Grad Rate	n	6-year Grad Rate	n	6-year Grad Rate	n	6-year Grad Rate
Did not file FAFSA Form	2025	74.3%	20	0.0%	56	7.1%	126	22.2%	198	53.5%	442	76.7%	661	85.0%	522	89.3%
<$18,486	640	50.0%	12	8.3%	46	0.0%	88	15.9%	95	37.9%	143	57.3%	148	71.6%	108	75.0%
$18,487-$34675	1010	53.8%	15	0.0%	56	3.6%	134	15.7%	135	40.7%	243	62.6%	258	68.6%	169	80.5%
$34,676-$55230	1613	62.7%	20	0.0%	53	0.0%	168	21.4%	253	47.4%	363	69.4%	441	78.5%	315	81.9%
$55,231-$88,002	2557	66.4%	24	0.0%	62	0.0%	257	24.5%	328	51.5%	597	68.0%	731	79.2%	558	86.0%
>$88,002	4367	77.6%	16	0.0%	65	3.1%	298	32.2%	445	58.9%	1002	74.6%	1405	88.1%	1136	91.9%
Total Students	12212	69.3%	107	0.9%	338	2.4%	1071	24.1%	1454	51.4%	2790	70.9%	3644	82.5%	2808	87.8%

Table 2: Logistic Regression Model - Predicting Six-year Graduation for All Students (n=12,105)

	Model 1	Model 2	Model 3
Model Variables[a]			
Constant	.030	3.01	.04
First-year cumulative GPA	4.69	-	4.49
Completed FAFSA	-	.38	.49
Completed FAFSA and Family Income (10k)	-	1.08	1.06
Model			
Correct Predicted	77.5%	69.9%	77.5%
Nagelkerke R^2	.289	.048	.306

Null model correct predicated = 69.9%

a: Odds ratio presented

Table 3: Distribution of First-year Net Cost of Attendance by Family Income (University-Wide)

		Net Cost of Attendance							
	n	Less than $0	$0k – $5k	$5k -$10k	$10k-$15k	$15k-$20k	More than $20k	Mean (in $10k)	Median (in $10k)
Did Not file FAFSA	2025	.9%	1.7%	2.6%	7.5%	25.2%	62.0%	2.07	2.07
<$18,486	640	3.8%	37.5%	26.7%	17.2%	8.3%	6.6%	0.79	0.61
$18,487-$34,675	1010	3.6%	38.8%	32.5%	14.8%	6.7%	3.7%	0.70	0.58
$34,676-$55,230	1613	2.0%	33.2%	31.3%	18.7%	10.4%	4.3%	0.83	0.71
$55,231-$88,002	2557	1.3%	27.5%	23.5%	23.4%	15.9%	8.3%	1.01	0.94
>$88,002	4367	1.0%	19.2%	12.8%	14.8%	26.9%	25.3%	1.43	1.56
Total	12212	1.5%	22.5%	18.2%	16.0%	19.5%	22.3%	1.28	1.26

Table 4: Distribution of First-year Net Cost of Attendance by Family Income (Flagship Campus)

		Net Cost of Attendance							
	n	Less than $0	$0k – $5k	$5k -$10k	$10k-$15k	$15k-$20k	More than $20k	Mean (in $10k)	Median (in $10k)
Did Not file FAFSA	1287	1.5%	1.8%	2.4%	6.8%	8.4%	79.1%	2.25	2.09
<$18,486	203	5.4%	40.9%	18.2%	14.3%	8.9%	12.3%	0.85	0.59
$18,487-$34,675	298	7.0%	39.9%	24.8%	13.1%	7.0%	8.1%	0.73	0.54
$34,676-$55,230	552	4.3%	38.2%	22.5%	15.8%	10.5%	8.7%	0.84	0.65
$55,231-$88,002	1006	1.4%	33.8%	15.5%	16.2%	17.3%	15.8%	1.09	0.98
>$88,002	2566	1.4%	19.1%	8.4%	8.8%	26.4%	35.9%	1.61	1.82
Total	5912	2.1%	21.4%	10.8%	10.7%	17.9%	37.1%	1.52	1.72

Table 5: Distribution of First-year Net Cost of Attendance by Family Income (Residential Regional Campuses)

		Net Cost of Attendance							
	n	Less than $0	$0k – $5k	$5k -$10k	$10k-$15k	$15k-$20k	More than $20k	Mean (in $10k)	Median (in $10k)
Did Not file FAFSA	459	0.0%	1.1%	2.8%	5.7%	42.5%	47.9%	1.88	1.99
<$18,486	256	2.3%	35.5%	28.5%	19.9%	8.6%	5.1%	0.80	0.67
$18,487-$34,675	404	2.7%	35.4%	33.2%	16.3%	9.7%	2.7%	0.75	0.65
$34,676-$55,230	665	.9%	32.6%	32.5%	19.7%	11.7%	2.6%	0.83	0.74
$55,231-$88,002	988	1.5%	27.3%	24.0%	24.1%	18.5%	4.6%	0.97	0.94
>$88,002	1235	.5%	23.4%	14.7%	17.2%	30.3%	14.0%	1.22	1.34
Total	4007	1.1%	25.3%	21.3%	18.1%	22.2%	12.0%	1.09	1.04

Table 6: Distribution of First-year Net Cost of Attendance by Family Income (Nonresidential Regional Campuses)

		Net Cost of Attendance							
	n	Less than $0	$0k – $5k	$5k -$10k	$10k-$15k	$15k-$20k	More than $20k	Mean (in $10k)	Median (in $10k)
Did Not file FAFSA	259	0.0%	2.3%	3.5%	14.7%	75.7%	3.9%	1.52	1.56
<$18,486	169	4.1%	39.1%	36.1%	13.0%	5.3%	2.4%	0.66	0.54
$18,487-$34,675	293	1.4%	44.4%	39.6%	11.9%	2.4%	.3%	0.59	0.55
$34,676-$55,230	376	.8%	28.7%	43.6%	19.7%	5.9%	1.3%	0.77	0.69
$55,231-$88,002	539	.7%	17.3%	38.2%	35.3%	7.6%	.9%	0.90	0.86
>$88,002	550	.2%	10.7%	29.3%	37.1%	21.5%	1.3%	1.08	1.20
Total	2186	.9%	21.1%	32.8%	25.8%	18.0%	1.5%	0.94	0.89

Table 7: Six-year Graduation Logistic Regression Model for Flagship Campus by Family Income

	Did Not fill FAFSA	<$18,486	$18,487-$34,675	$34,676-$55,230	$55,231-$88,002	>$88,002
Model Variables[a]						
Constant	.08	.02	.13	.23	.05	.04
First-year cumulative GPA	4.38	5.59	3.23	4.33	5.41	5.75
NCOA (per 10k)	.97	1.06	.72	.78	.75	.96
Model Evaluation						
Correct Predicted	88.2%	80.8%	78.5%	84.2%	87.2%	89.6%
Nagelkerke R^2	.184	.361	.167	.225	.259	.221
Null Model Correct Predicted	86.6%	70.9%	74.5%	80.6%	83.2%	88.2%
n	1287	203	298	552	1006	2566

a: Odds ratio presented

Table 8: Six-year Graduation Logistic Model for Residential Regional Campuses by Family Income

	Did Not fill FAFSA	<$18,486	$18,487-$34,675	$34,676-$55,230	$55,231-$88,002	>$88,002
Model Variables[a]						
Constant	.04	.04	.01	.04	.09	.04
First-year cumulative GPA	3.48	3.24	4.72	4.08	3.13	3.70
NCOA (per 10k)	1.24	.80	1.20	.64	.80	1.38
Model Evaluation						
Correct Predicted	73.4%	63.3%	70.8%	71.9%	69.6%	73.4%
Nagelkerke R^2	.228	.233	.329	.293	.201	.227
Null Model Correct Predicted	62.1%	56.6%	50.0%	57.4%	61.6%	67.7%
n	459	256	404	665	988	1235

a: Odds ratio presented

Table 9: Six-year Graduation Logistic Model for Nonresidential Regional Campuses by Family Income

	Did Not fill FAFSA	<$18,486	$18,487-$34,675	$34,676-$55,230	$55,231-$88,002	>$88,002
Model Variables[a]						
Constant	<.01	.01	.03	.04	.01	.03
First-year cumulative GPA	3.42	4.69	3.36	3.62	4.79	3.65
NCOA (per 10k)	6.54	.73	.90	.62	.85	1.00
Model Evaluation						
Correct Predicted	67.2%	69.2%	65.9%	71.0%	70.1%	68.4%
Nagelkerke R^2	.288	.363	.260	.249	.296	.233
Null Model Correct Predicted	59.5%	62.1%	59.4%	50.8%	53.4%	52.9%
n	259	169	293	376	539	550

a: Odds ratio presented

Table 10: First-year CGPA OLS Regression Models with SAT and Family Income as Predictors

	University-Wide	Flagship Campus	Residential Regional Campuses	Nonresidential Regional Campuses
Constant	2.05	2.44	2.17	1.95
Total SAT score (per 100)	.09	.06	.06	.06
Completed FAFSA	-.17	-.16	-.07	.07
Completed FAFSA and Family Income (per 10k)	.01	.01	.01	.01
Adjusted R^2	.077	.054	.021	.024

Table 11: First-year CGPA OLS Regression Models by Family Income Levels (Flagship Campus)

	Did Not fill FAFSA	<$18,486	$18,487-$34,675	$34,676-$55,230	$55,231-$88,002	>$88,002
Constant	3.18	2.80	2.95	2.98	3.04	3.16
NCOA (per 10k)	-.01	.07	.01	.01	.02	.01
Adjusted R^2	.000	.000	.000	.000	.000	.000

Table 12: First-year CGPA OLS Regression Models by Family Income Levels (Residential Regional Campuses)

	Did Not fill FAFSA	<$18,486	$18,487-$34,675	$34,676-$55,230	$55,231-$88,002	>$88,002
Constant	2.56	2.61	2.78	2.92	2.77	2.80
NCOA (per 10k)	.11	-.01	-.21	-.25	.03	.02
Adjusted R^2	.002	.000	.014	.025	.000	.000

Table 13: First-year CGPA OLS Regression Models by Family Income Levels (Nonresidential Regional Campuses)

	Did Not fill FAFSA	<$18,486	$18,487-$34,675	$34,676-$55,230	$55,231-$88,002	>$88,002
Constant	2.88	2.54	2.71	2.79	2.85	2.66
NCOA (per 10k)	-.24	-.22	-.33	-.12	-.20	.03
Adjusted R^2	.001	.005	.013	.001	.009	.000

Table 14: OLS Regression Models for Length of time for Students who did not Graduate within Six Years (n=3,639)

	Model 1	Model 2
Constant	2.36	2.50
First-year cumulative GPA	.24	.24
NCOA (10k)	-	-.13
Adjusted R^2	.017	.019

THE RIPPLE EFFECT: DECLINING STUDENT INTEREST IN HUMANITIES AMIDST GROWING DEMAND FOR PROFESSIONAL EDUCATION

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Working brief

Abstract

As students and policymakers increasingly view college as a steppingstone to the professional labor market, scholars and pundits have noted flagging student interest in the humanities. This working brief examines the degree to which humanities degree conferrals are dropping nationally and describes an initiative one institution undertook to curtail declining undergraduate enrollments. A review of publicly available data found that degree conferrals in the humanities experienced the steepest decline in the 1960s and that changes can be partially attributed to demographic shifts. Compared to other institutions, Ivy League and Top 50 ranked *US News and World Report* institutions have experienced stronger shifts away from the humanities and greater movement toward natural sciences and other fields over the past ten years. The findings also reveal variation in the proportion of degrees awarded by major within humanities and uneven student interest across pre-professional programs. To address decreasing student enrollments and concentrations in its humanities division, Harvard's Humanities Project outlined a multi-faceted approach for the Division to more effectively reach and interest students in humanities coursework and engage students in new, innovative forms of learning. Harvard's experience suggests that shifting enrollments creates opportunities to revisit teaching and the role of real-world skill development. The case study also demonstrates how institutional research offices can offer leadership by helping administrators understand core issues and data behind changes in enrollments, and by tracking enrollments and students' learning experiences by

division. Moving forward, institutional research offices have an opportunity to assess student and graduate outcomes across divisions and contribute to the national conversation on the relationship between humanities and career preparation.

Soaring tuition, rising student debt, and a post-recessionary economy have revived debates about the role of humanities and job preparation in higher education. Students are increasingly mindful of the connection between the labor market and their postsecondary education: the annual Higher Education Research Institute (HERI) survey found that an all-time high proportion of incoming freshmen think it is very important to go to college to "make more money" (74.6%) and to get a better job (87.9%; Pryor, Eagen, Palucki Blake, Hurtado, Berdan, & Case, 2012). However, approximately half of new graduates are unemployed or underemployed (Vedder, Denhart, & Robe, 2013).

In the current economy and policy climate, humanities and liberal arts have seemingly fallen out of favor with the public. The media and policy and think tank reports often feature humanities and liberal arts as "worst" majors given their employment and salary prospects (Carnevale, Cheah, & Strohl, 2012; Carnevale, Strohl, & Melton, 2011; Goudreau, 2012; Rapacon, 2013). Earlier this year, Florida's Blue Ribbon Task Force on State Education Reform recommended that students enrolled in low-demand majors pay higher tuition than their peers. It is plausible that more students are gravitating away from the humanities and liberal arts and toward other, more lucrative fields and career paths (Wilson, 2012).

News headlines articulate colleges' and universities' concerns over the shift away from humanities (e.g., October 2013 *New York Times* article "As interest fade in the humanities, colleges worry"). In June 2013, 160 employers and 107 college presidents signed an Association of American Colleges and Universities (AACU) compact promoting the significance of a 21st century liberal arts education to the public and on their campuses. Proponents of a liberal arts education posit that higher education should not be viewed in solely instrumental or economic terms. A liberal arts education offers students the ability to develop their critical thinking skills,

creativity, and awareness of their environments – skills and abilities that will guide students throughout the course of their lives and promote the advancement of our society. These generalizable skills also assist students in the labor market and in an economy that is experiencing rapid technological change and globalization (McPherson, 1998).

Yet amidst students' and policymakers' concerns about the economic value of a college education, it is important for higher education leaders to understand how student demand for the humanities has recently shifted, if at all. Additionally, it is helpful to garner a sense of institutional responses to changing student interests: what are specific ways institutions have contended with new student demands? This working brief synthesizes national data and published reports and articles to offer a descriptive view of fluctuating student interest in the humanities and serve as a starting point for discussion and future research.

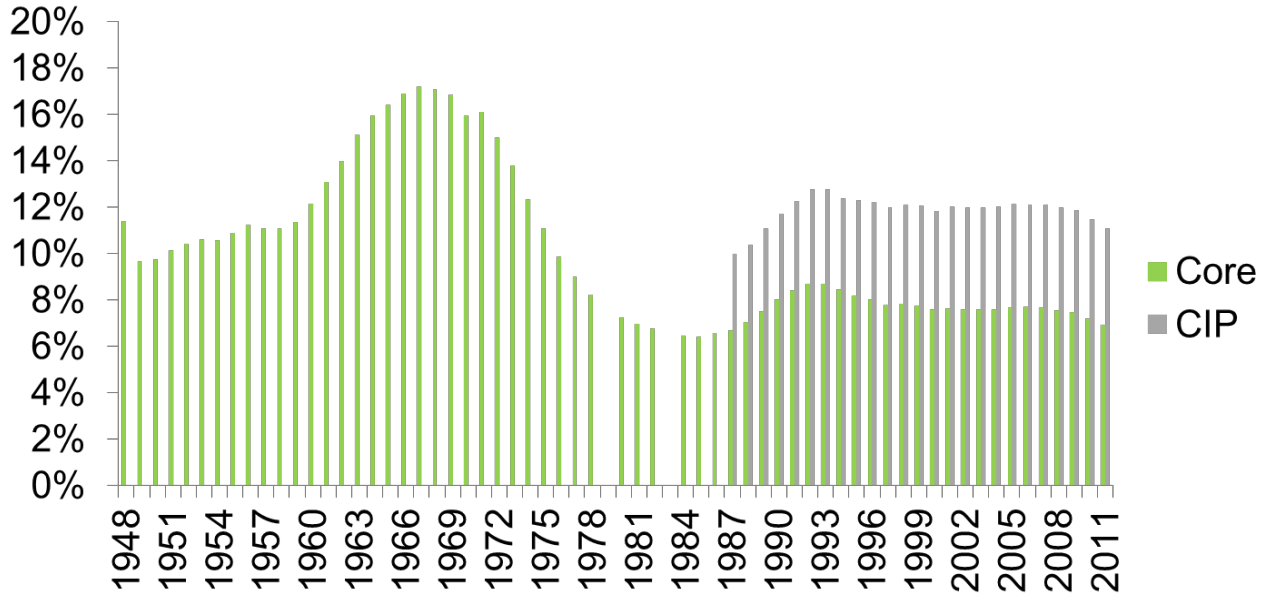
Dispelling the Humanities "Crisis"

Headlines often denote waning interest in humanities (Brooks, 2013; Siegel, 2013). Many articles cite the precipitous drop in humanities majors from 1966 – when one in six (17%) degrees were awarded in the humanities – to 2011, when one in twenty (6%) degrees were in the humanities according to American Academy of Arts and Sciences (AAAS) definitions. However, as scholars note, this seemingly precipitous drop in humanities degree conferrals may be misleading and be more reflective of shifts in demography and the growth of other fields. How one frames analysis and investigates the underlying assumptions shape our understanding of trends in humanities degrees.

The baseline year, for instance, impacts how much degrees appear to decline. Ben Schmidt (2013), a former fellow at the AAAS, notes that recordkeeping has contributed to the

perception that student interest in humanities has dipped. NCES had not digitized earlier degree conferral data, leading many to anchor reporting about the humanities enrollments in the mid-1960s, which is coincidentally the highest point of degree conferrals in the humanities. A review of historical data assembled by AAAS from the 1940s onward reveals that enrollments have seesawed, and that the decline was sharpest from the late 1960s and 1970s to the mid-1980s. The proportion of bachelor's degrees awarded in the humanities has remained relatively stable over the past twenty years.

Figure 1. Bachelor's degrees awarded in the humanities

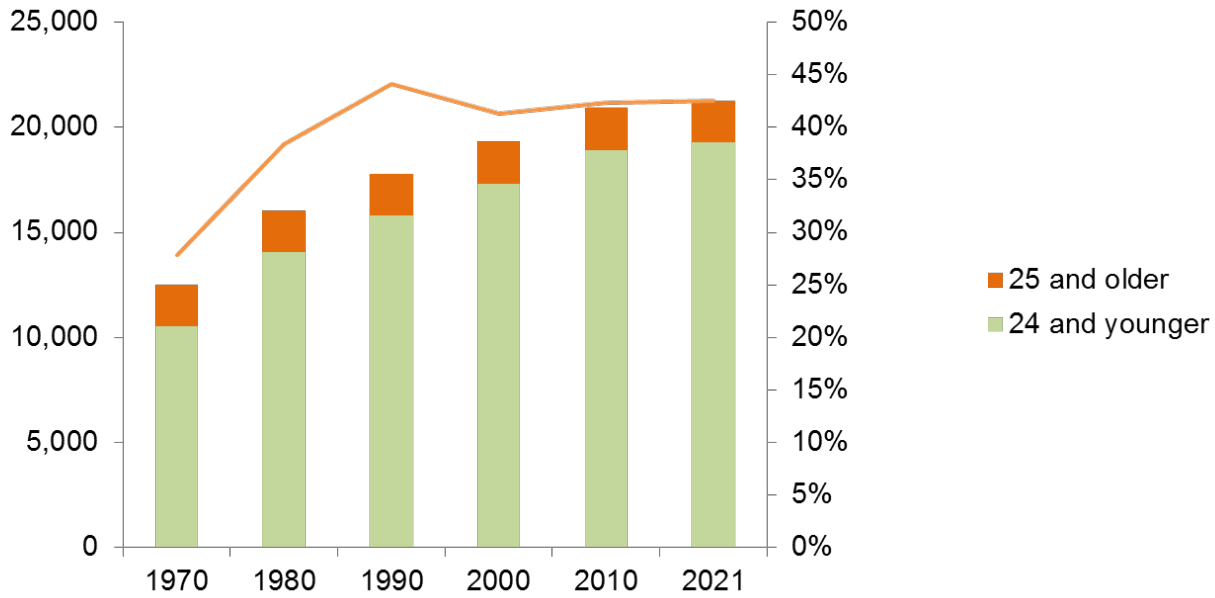


Source: American Academy of Arts and Sciences. (2013). Supporting Table II-1a: Bachelor's Degree Completions in the Humanities (Absolute Number and as a Percentage of All Bachelor's Degree Completions), 1948–2011. *Humanities Indicators*, humanitiesindicators.org. AAAS uses two methodologies (Core and CIP) to aggregate humanities majors over time.

Given the surge of older working students who are more likely to seek out career-oriented programs, statistician Nate Silver (2013) argues that the percentage of bachelor's degrees awarded in the humanities has actually remained relatively stable over time when only considering the traditional-aged student population. According to his calculations, there has been

a less than a one percent change from 1971 to 2011 in the distribution of bachelor's degrees awarded in English as well as other subject areas such as statistics, engineering, and social sciences and history among students aged 24 and younger. Health professions, business, and criminal justice are majors that have experienced the greatest growth. Hence, the declining proportion of degree conferrals in the humanities can be attributed to a growing number of adults enrolling in higher education who are more likely to be working and looking for career advancement. Looking ahead, the proportion of adult students will only continue to grow: NCES (2012) estimates that student enrollments under the age of 25 will increase 10% compared to 20% for students age 25 and older in 2020 (see Figure 2).

Figure 2. Total fall enrollment in degree-granting institutions by student age and proportion of enrollments 25 and older, select years



Other scholars like Ben Schmidt have noted that the dip in humanities degree conferrals also corresponds with women's increasing participation in higher education and exodus from the humanities to other fields. For instance, according to NCES data, in 1970, 43% of bachelor's degrees were awarded to women; at that time, 16% of women majored in English and foreign

languages. By 1980, nearly half (49%) of degrees were awarded to women and the percentage majoring in English and foreign languages dropped dramatically (7%).

One also needs to consider variation within the humanities: individual majors have differed in their rate of growth and decline over time. English, for example, constituted 45% of bachelor's degrees awarded in the humanities in 1970-1971, but only 18% in 2010-2011. In contrast, visual and performing arts increased from 21% to 33% of all humanities degrees awarded during that same time period.

Have Degrees Shifted by Fields in The Past Ten Years?

From an institutional decision-making perspective, it is helpful to hone in on trends in the past ten years. As such, descriptive statistics were generated for 3,083 U.S. institutions that conferred bachelor's degrees as reported to the National Center for Education Data Set (NCES) Integrated Postsecondary Education Data Set (IPEDS) in 2002-2003 and 2011-2012 to explore trends over a ten-year timeframe. Approximately half of the institutions are private, not-for-profit (51.9%) and the remainder is for-profit (25.6%) and public, not-for-profit (22.4%). A small proportion (5.1%) of institutions has a sole Arts and Science focus according to the Carnegie 2010 classification of undergraduate instruction. Analysis examined shifts in distribution across the 2003 to 2012 academic years by field and two-digit Classification of Instructional Program codes (CIP), using NCES definitions.

Although scholars have noted that humanities degree conferrals have remained relatively stable in recent years, it is important to note that there has been substantial growth during the past ten years in bachelor's degrees conferred overall and across all disciplines. Among the institutions of focus, bachelor's degree conferrals grew 33% from 1,343,284 in 2002-2003 to

1,793,157 in 2011-2012 and at a compound annual growth rate of 3.26%. By sector, for-profit colleges and universities exhibited the strongest growth, tripling their degree conferrals during this time period (307%) while public institutions grew 29.7% and private, non-profit grew 20.5%. As Table 1 highlights, the number of degrees awarded grew across nearly all fields; the rate of growth was highest in the "other fields" category (6.1% CAGR) followed by natural sciences (5.1%), and social and behavioral sciences (3.0%) (based on NCES classification of two-digit CIPs into disciplines). The number of humanities degrees awarded increased 24.5% over the time period, or at a 2.5% annual growth rate.

Table 1. Number and distribution of bachelor's degrees conferred by field, 2002-2003 and 2011-2012

Field	2003 Degrees	2012 Degrees	2003 (%)	2012 (%)	Change from 2003-2012 (%)	CAGR
Business	290,899	367,414	21.7%	20.5%	-1.2%	2.6%
Computer sciences and engineering	134,205	146,045	10.0%	8.1%	-1.8%	0.9%
Education	104,791	105,846	7.8%	5.9%	-1.9%	0.1%
Humanities	237,423	295,723	17.7%	16.5%	-1.2%	2.5%
Natural Sciences	90,332	141,488	6.7%	7.9%	1.2%	5.1%
Other fields	264,371	448,958	19.7%	25.0%	5.4%	6.1%
Social and behavioral sciences	221,263	287,683	16.5%	16.0%	-0.4%	3.0%
Total	1,343,284	1,793,157	100%	100%		3.3%

As Table 1 also indicates, the distribution of degrees awarded over the past ten years has moved toward fields "other" than business, computer sciences, education, and the humanities. Degrees in health-related professions underlie much of the growth in the "other fields" category; they represented 5.2% of bachelor's degrees in 2003 and 9.1% of all bachelor's degrees in 2012

(see Table 2). Within the other fields category, the share of degrees awarded in homeland security also increased from 26,022 degrees (or 1.9% of all bachelor's degrees) in 2003 to 53,807 (or 3.0% of all bachelor's degrees) in 2012. Among other fields and majors, biological and biomedical sciences increased from 59,928 degrees (4.5%) to 95,935 (5.4% of bachelor's degrees).

On the whole, humanities degrees declined slightly (-1.2%) as a proportion of overall bachelor's degrees. Most humanities majors (i.e., English, liberal arts, philosophy, theology) either decreased a little or experienced no change (i.e., foreign languages and area, ethnic, cultural, gender, and group studies). Only two humanities majors increased their share of overall bachelor's degrees: multi-interdisciplinary studies (.4% increase in share; 5.5% CAGR) and visual and performing arts (.1% increase in share, 3.4% CAGR).

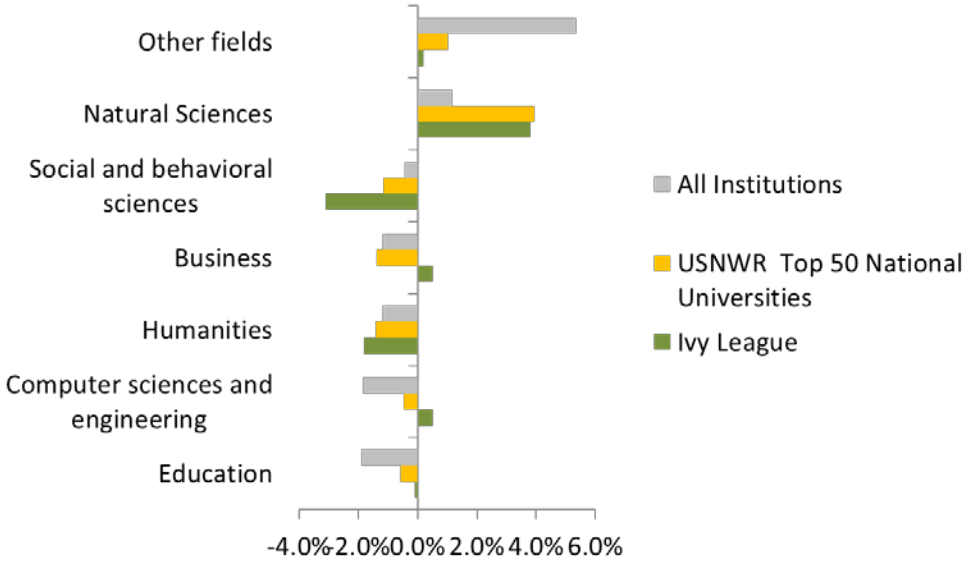
Similar to humanities, three other professionally-aligned fields, education and computer sciences and engineering, and business, also experienced decreases in the share of overall degrees awarded. Over the past ten years, the share of education degrees declined from 7.8% of bachelor's degrees in 2003 to 5.9% of bachelor's degrees in 2012. Additionally, computer and information sciences dropped slightly from 56,940 (4.2% of all bachelor's degrees) to 47,422 (2.6%) in 2012. The number of bachelor's degrees awarded in business, management, marketing, and related areas also represented a smaller proportion of all degrees (20.5%) in 2012 than in 2003 (21.7%).

Table 2. Bachelor's degrees conferred by field, 2002-2003 and 2011-2012

Field	Major	2003	2012	% of 2003 total	% of 2012 total	% change in distribution 2003-2012	CAGR
Business	Business, Management, Marketing, and Related Support Services	290,371	366,079	21.6%	20.4%	-1.2%	2.7%
	Personal and Culinary Services	528	1,335	0.0%	10.0%	0.0%	10.9%
Computer sciences and engineering	Engineering	62,713	81,460	4.7%	4.5%	-0.1%	3.2%
	Computer and Information Sciences and Support Services	56,940	47,422	4.2%	2.6%	-1.6%	-0.5%
	Engineering Technologies and Engineering-related Fields	14,233	16,536	1.1%	0.9%	-0.1%	2.3%
	Construction Trades	166	377	0.0%	0.0%	0.0%	9.5%
	Mechanic and Repair Technologies/Technicians	153	250	0.0%	0.0%	0.0%	5.6%
Education	Education	104,791	105,846	7.8%	5.9%	-1.9%	0.9%
Humanities	Visual and Performing Arts	71,026	95,834	5.3%	5.3%	0.1%	3.4%
	English Language and Literature	53,606	53,819	4.0%	3.0%	-1.0%	0.6%
	Liberal Arts and Sciences General Studies and Humanities	42,323	46,996	3.2%	2.6%	-0.5%	1.5%
	Multi-Interdisciplinary Studies	28,391	45,803	2.1%	2.6%	0.4%	5.5%
	Foreign Languages Literatures and Linguistics	16,923	21,783	1.3%	1.2%	0.0%	2.9%
	Philosophy and Religious Studies	10,342	12,746	0.8%	0.7%	-0.1%	2.4%
	Theology and Religious Vocations	8,206	9,510	0.6%	0.5%	-0.1%	1.7%
	Area Ethnic, Cultural, Gender and Group Studies	6,606	9,232	0.5%	0.5%	0.0%	3.8%
Natural Sciences	Biological and Biomedical Sciences	59,928	95,935	4.5%	5.4%	0.9%	5.4%
	Physical Sciences	17,727	26,118	1.3%	1.5%	0.1%	4.4%
	Mathematics and Statistics	12,497	18,875	0.9%	1.1%	0.1%	4.7%
	Science Technologies/Technicians	180	560	0.0%	0.0%	0.0%	13.4%
Other fields	Health Professions and Related Programs	70,424	163,837	5.2%	9.1%	3.9%	9.8%
	Communication Journalism and Related Programs	67,776	83,819	5.0%	4.7%	-0.4%	2.5%
	Homeland Security, Law Enforcement, Firefighting and Related Professions	26,022	53,807	1.9%	3.0%	1.1%	8.4%
	Parks Recreation Leisure and Fitness Studies	21,352	38,998	1.6%	2.2%	0.6%	6.9%
	Public Administration and Social Service Professions	19,783	29,710	1.5%	1.7%	0.2%	4.6%
	Family and Consumer Sciences/Human Sciences	17,704	23,428	1.3%	1.3%	0.0%	3.3%
	Agriculture Operations and Related Sciences	14,188	16,252	1.1%	0.9%	-0.1%	1.7%
	Natural Resources and Conservation	9,055	14,687	0.7%	0.8%	0.1%	5.5%
	Architecture and Related Services	8,983	9,728	0.7%	0.5%	-0.1%	1.9%
	Communications Technologies/Technicians and Support Services	1,933	4,982	0.1%	0.3%	0.1%	11.1%
	Transportation and Materials Moving	4,635	4,896	0.3%	0.3%	-0.1%	1.2%
	Legal Professions and Studies	2,369	4,596	0.2%	0.3%	0.1%	7.6%
	Library Science	99	95	0.0%	0.0%	0.0%	0.1%
	Military Technologies and Applied Sciences	6	86	0.0%	0.0%	0.0%	34.4%
	Precision Production	42	37	0.0%	0.0%	0.0%	0.0%
Social and behavioral sciences	Social Sciences	115,297	143,511	8.6%	8.0%	-0.6%	2.6%
	Psychology	78,238	109,021	5.8%	6.1%	0.3%	3.8%
	History	27,728	35,151	2.1%	2.0%	-0.1%	2.8%
Total		1,343,284	1,793,157	100.0%	100.0%		3.3%

However, shifts in the distribution of degree conferrals varied across groups of institutions. As Figure 3 demonstrates, Ivy League and top 50 ranked *US News and World Report* national universities experienced stronger movement in their overall distribution away from the humanities and social and behavioral sciences and toward the natural sciences compared to all colleges and universities in the 2003 to 2012 academic years.

Figure 3. Distribution of bachelor degree conferrals at Ivy League, Top 50 *US News and World Report (USWNR)* national universities and all other institutions by field, 2002-2003 and 2011-2012



Note: Ivy League institutions include Brown University, Columbia University, Cornell University, Dartmouth University, Harvard University, Princeton University, University of Pennsylvania, and Yale University. Top 50 USNWR universities are based on 2014 rankings.

The Humanities Project: One Institution's Response to Declining Enrollments

Corresponding with the finding that certain groups of institutions have faced sharp declines in their humanities degree conferrals, one such institution, Harvard University, sought to draw the public's attention to the importance of the humanities and to boost its own students' interest in the field. This section describes how Harvard's Humanities Project initiative was

formed and implemented and is based on a review of articles and reports and interviews with faculty and administration involved in the Project.

Context. Founded in 1636, Harvard is one of the oldest universities in the United States. Humanities have had a long tradition at the University, with approximately 40% of the 2,275 full-time equivalent faculty based at the Faculty of Arts and Sciences (FAS) and approximately 42% of its $32.7 billion endowment belonging to FAS. Over one-third (35%) of degrees are awarded from FAS which includes Harvard College and the Graduate School of Arts and Sciences. While Harvard is a unique institution in several regards, the University serves as a bellwether in higher education given its position as one of the oldest, most prestigious universities in the nation.

As a large, decentralized university with 14 degree granting schools, Harvard University had previously engaged in several university-wide initiatives to explore the role of arts and humanities on campus and to foster cross-school collaboration. Recent efforts have included the Arts Task Force, Harvard University Council of Arts, Report on the Study of Religion, and development of its American Repertory Theater. All of the initiatives have explored ways to make aspects of arts and humanities more relevant on campus, including to undergraduate students.

President Drew Faust has also published op-eds and delivered speeches calling attention to the non-economic value of higher education amidst growing public interest in college graduates' employability. In a speech delivered at the Royal Irish Academy in 2010, President Faust noted the importance of developing students' interpretation skills and curiosity through a liberal arts education:

> When we define higher education's role principally as driving economic development and solving society's most urgent problems, we risk losing sight of broader questions, of the kinds of inquiry that enable the critical stance, that build the humane perspective, that foster the restless skepticism and unbounded curiosity from which our profoundest understandings so often emerge...
>
> An overly instrumental model of the university misses the genius of its capacity. It devalues the zone of patience and contemplation the university creates in a world all but overwhelmed by stimulation. It diminishes its role as an asker of fundamental questions in a world hurrying to fix its most urgent problems. We need both.

Similarly, in a February 2013 op-ed to the *New York Times*, President Faust argued that the merit of a postsecondary education was being overshadowed by employment concerns: "The focus in federal policy making and rhetoric on earnings data as the indicator of the value of higher education will further the growing perception that a college degree should be simply a ticket to a first job, rather than a passport to a lifetime of citizenship, opportunity, growth and change."

Arts and Humanities Division Initiative. Over the past several years, faculty and administration in the Arts and Humanities Division of FAS have observed fewer students in their courses, which are already designed to be small and enable intensive interactions between students and faculty (e.g., in 2011-2012, 44% of classes at the College had nine or fewer students). Whereas approximately half of Harvard College students concentrated in the humanities in the 1920s, that percentage has drastically decreased over time. Meanwhile, the faculty has watched the University's efforts to bolster sciences and engineering with great interest. In 2007, the Division of Sciences and Engineering officially became the School of Engineering and Applied Sciences (SEAS), the first school the University formed in decades. SEAS has grown steadily since: the number of faculty increased from 43 to approximately 70 FTEs with plans to expand to over 100 FTE faculty and a new building on the Allston campus in

the coming years. Among students, the number of computer science, applied mathematics, and biomedical engineering concentrators has grown over 10% in the past two years (Zhang, 2013).

After many conversations with department heads, in 2011, the Dean of the Arts and Humanities Division decided that it was time to proactively address the role of humanities at the university and explore what actions the Division might take. The Dean called together two faculty working groups; one working group explored the role of humanities in the university mission and its history and the other working group examined how the curriculum could excite students' interest and promote departmental collaboration. Each group, chaired by two faculty members, was to generate a set of recommendations by the end of the following academic year, or a year and a half later. Working groups set ambitious agendas for themselves and developed reading lists of major works and examined efforts at other institutions to inform their actions. Each group was staffed by a graduate student to help the committees complete their work within a year and a half.

Role of Institutional Data. Institutional data played an important role in helping the working groups understand the magnitude of decline in enrollments and concentrators in the humanities division, as well as make the case to other faculty and the public about the need for intervention. Institutional data also played a critical role in guiding recommendations to the Division. Harvard College's institutional research office conducted in-depth analyses about humanities concentrators relative to other divisions by exploring various survey data and institutional data.[1] Among questions the office explored: How have course enrollments and student concentrations changed by division over time? Do students on financial aid tend to

[1] There are two institutional research offices at Harvard. Harvard College's institutional research office focuses primarily on the undergraduate population. The author is situated in the University institutional research office under the Office of the President and Provost.

concentrate in different departments? Do peer institutions face similar trends in degree conferrals by field? What are the motivations behind students' major selection? How does student persistence in and satisfaction with concentration vary across divisions?

Results illustrated the steep decline in the number of humanities concentrators from 36 to 20 percent over the past 60 years (when including the History department). From 2001 to 2011, enrollment in general education courses fell by 9% while enrollment in science courses climbed 12%. Yet humanities concentrators rated high levels of satisfaction with their concentrations compared to students from other divisions. Importantly, data revealed that approximately half of students who entered the College with hopes of concentrating in the humanities ultimately ended up concentrating in another division, and most frequently the social sciences. The proportion of students leaving the Arts and Humanities Division surpassed other divisions. The committees realized that the first three semesters were a critical period for the Arts and Humanities Division to retain students before they declared their concentration.

Humanities Project recommendations. The committees put forth numerous suggestions, some of which have already been implemented. One of the major changes has been the addition of new courses. Given the critical period between students' entrance and declaration of their concentration, the Committee recommended that a set of introductory "framework" courses be developed. Although the Division had a plethora of courses that offered small class sizes and close interaction with faculty, members of the committee acknowledged that this class structure might not appeal immediately to all students. With strong instruction and interesting content, the courses were designed to be meaningful learning experiences and to encourage students to continue taking humanities courses or concentrating in the humanities. These courses, "The Art of Listening," "The Art of Reading," and "The Art of Looking" are interdisciplinary and seek to

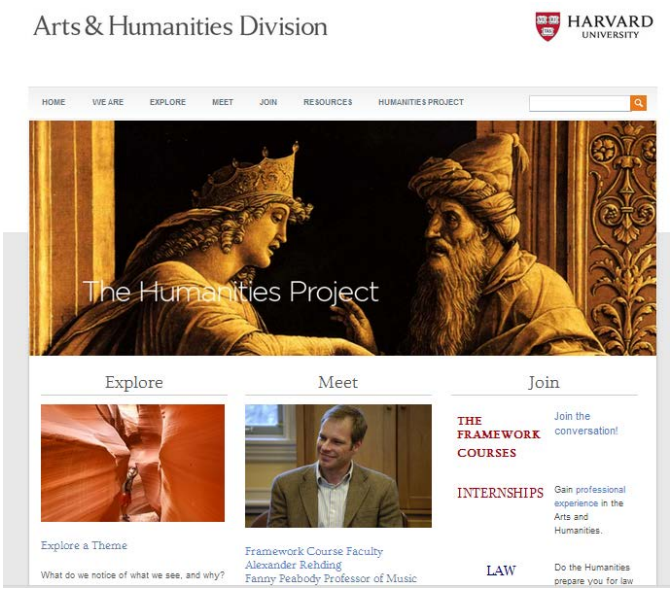
incorporate student engagement. In The Art of Looking, for instance, students learn about different ways of thinking and important works through a range of technologies that span time, culture, and medium. Some of these technologies include television, film, glass, mahogany, color, and graphs. As the course syllabus notes:

> *The Art of Looking* aims to give students a solid grounding in the techniques of humanistic research and analysis, as well as an understanding of how humanistic thinking can transform civic participation, social experience, and everyday life. It will foster skills in analytic thinking, verbal and visual communication, and creative problem solving that will prepare students to be more effective students, citizens, and professionals across a broad spectrum of fields.

Each week, students spend one session in lecture, section, and a hands-on learning laboratory.

Division leaders also discussed the importance of changing students' perceptions about the humanities. To confront beliefs that college concentrations should directly align with post-graduation employment, the Division sought to communicate that humanities concentrators could continue onto any profession they desired. One way to communicate this message was through a redeveloped website. Previously, the website was a basic, internal site ("iSite") that served as a portal to individual departments. Under the direction of a staff member in the Dean's Office, the new website was meant to be a "most beautiful museum" that invited visitors to explore information on the site. Select alumni were profiled to highlight how their humanities coursework helped prepare them for careers in a variety of fields, such as law. The site also provided links for students to Career Services.

Figure 4. Screen shot of new Arts and Humanities Division website



The updated website also corresponded with the redevelopment of a more user-friendly course catalog website. Previously, students had to weed through scores of class descriptions and could become easily overwhelmed and/or overlook similar courses. On this new site, students could sort humanities courses of interest by topic. Outreach extended beyond the website to include postcards, posters, and a new logo to help launch the framework courses. There is also a new freshmen-only website that invites new students to explore more about the Division.

Additionally, a student advisory committee composed of approximately eight sophomores was called together to dialogue with the dean about the humanities on campus. These monthly meetings allow the dean to test ideas and get a sense of current perceptions of ongoing efforts. The advisory board, for instance, shaped the communication strategy: Members discussed how they felt bombarded with social media and felt an alternative form of outreach would be refreshing. This feedback helped shape the Division's website to evoke feelings of serenity.

The committee made several other recommendations, including adding faculty positions and lending greater consideration to co-taught courses across divisions and schools. There have also been events. In May, President Faust hosted a public forum, The Humanities and the Future of the University, which featured faculty panelists from University of California, Los Angeles, Columbia University, and Tufts University.

Looking forward. Overall, individuals involved in the effort view change as slow, as the initiative requires a change in the institutional culture and more broadly, changes in societal perceptions of the humanities. Circumstances necessitate the Division to be more responsive to the external environment and for faculty to break from the siloed, solitary nature of academic research that many are accustomed to. Faculty must look beyond their own research, classes, and departments to help solve problems as a Division.

The current focus of the committee is to continue outreach to departments to obtain greater institutional support and to enhance student interest in the humanities. Members of the committees have also continued to discuss ways to further the efforts, including developing thematically based course clusters that allow cohorts of students to explore topics of interdisciplinary nature over the course of two years. A year-long framework course will be launched in 2014-2015. Additionally, ideas have been raised about creating spaces on campus such as cafes and exhibitions where students can gather and discuss relevant topics. While administrators consider efforts to be successful if there is enhanced discussion and awareness of the importance of humanities, course enrollments, course evaluations, and numbers of concentrators are also being tracked carefully.

Discussion

Although much attention has focused on the declining proportion of bachelor's degrees in humanities, the review of national data offers clarity on the so-called "humanities crisis." From a longitudinal perspective, the height of degree conferrals in the humanities occurred in the 1960s during a time when participation in higher education was expanding among women and adults. The data suggest that degree conferrals in the humanities have remained relatively stable over the past few decades when taking student demographics into consideration. An examination of data from the past ten years reinforces arguments that there have not been large shifts in the distribution of bachelor's degree conferrals for most fields. Rather, there have been fields such as healthcare that have experienced strong growth, as well as uneven change across career-friendly fields (i.e., education) and within fields when looking at individual majors (i.e., English; Visual and Performing Arts). The data also suggest that certain institutions, such as the Ivies and the Top 50 experienced more acute drops in humanities' degree conferrals. Based on current trends, humanities is unlikely to be a field of tremendous growth, especially when compared to other fields such as healthcare and natural sciences.

The Harvard Humanities Project highlights how declining enrollments became an opportunity for innovation within a division and an opportunity for greater cross-departmental and interdisciplinary collaboration. While it is early to know the outcomes of the project, the initiative represented a broader signal to students and the public at-large about the importance of humanities. Further, the project underscored the importance of institutions taking stock of their students' perspectives in every aspect related to course and major selection, from designing websites to outreach efforts and new course development.

The Project fits in with broader discussion about integrating the humanities with real-world skill development and experiences. Some institutions have adjusted their curriculum to

make direct connections to careers. Stevenson University, for instance, has sought to integrate liberal arts education with career development in every course (Markley, 2013). In the higher education sector, there has been an emergence of services offered to colleges and universities that bridge student learning and career preparation (Stokes, 2013). In 2013, LinkedIn launched its University Pages, a site designed for high school students to understand the sectors and fields alumni with LinkedIn profiles enter. Coursesolve also launched in 2013 and is a site that matches college courses with companies, organizations, and individuals that seek out postsecondary students' consultation and support to real-world problems. In another example, the Council for Aid in Education (CAE) released the Collegiate Learning Assessment Plus (CLA+), a performance assessment which measures students' critical thinking through problem-solving real-world scenarios. Students sift through information in order to generate a solution to a problem. The measure assesses students' scientific and quantitative reasoning, critical reading and evaluation, and argument critique. According to the CAE, the CLA+ can help identify work readiness of graduating seniors.

Additionally, institutions are increasingly finding ways to enhance their career services. In a survey of 600 career center directors, the National Association of Colleges and Employers (2012) found that only one quarter of directors felt that their students had the right tools to find a job. Many career centers are reexamining their offerings and ways they are serving students in the challenging economy. A number of institutions have sought alumni assistance in finding student or graduate internship placement or employment. York College, for instance, aimed to find employment matches for 100 students through its alumni's employers, and surpassed its goals (Harpaz, 2013). Some career programs have humanities majors deliver a personal brand

pitch that highlights their employability based on the skills they have developed through their studies.

The debate about humanities' future remains and there is no shortage of opinions about how it must continue to change. Some argue that humanities' faculty is not doing enough to engage students; others have noted that humanities as a scholarly field has been too inward-facing and that traditional preparation of humanities faculty are ill-suited to interdisciplinary nature of 21st century issues. Some scholars see movement toward digital humanities as a welcome change. Others point to the need for greater outreach during high school to interest students. Certainly, public concern about college graduates' employment experiences will not subside and higher education will need to find ways to adapt.

Implications for Institutional Researchers

The institutional case study demonstrates how declining enrollments and changing public sentiment about the role of humanities in higher education can lead to opportunities to innovate both in the curriculum and in institutional practices. As storytellers of data, institutional researchers have the ability to shape policy and institutional innovation (Parmley, 2009) by informing leaders about how institutional data fit into the college's or university's mission, strategy and broader policy discussions. In the case of shifting enrollments, the case study highlights the several steps institutional research offices can take in support of committee work, as Harvard College's Office of Institutional Research did with the Humanities Project. Institutional researchers can take "deep dives" to identify trends in student enrollment patterns, major changes, student satisfaction, and engagement, and help committees and leaders understand what the data collectively mean. For instance, institutional researchers can explore

questions like: How are enrollments and degree conferrals shifting at one's institution? How do humanities students' academic experiences compare to their peers from other disciplines? Similarly, institutional researchers can explore national and peer data to obtain institutional context.

Additionally, institutional research offices can play an important role in helping leaders navigate national policy discussions as Harvard University's Office of Institutional Research has by responding to administrators' questions and proactively identifying issues. What does the data behind national "crises" say? How should we be thinking and talking about some of the impending policy changes in higher education? In exploring trends, the findings underscore the importance of being mindful of the data parameters —such as the timeline one uses and of shifting demographics at one's institution and nationally— when framing major changes.

Amidst strong attention toward the humanities and student outcomes, there are many opportunities for further exploration of this topic. Future research might examine how disciplinary study relates to later life achievements and satisfaction with one's major. Additionally, IPEDS and other national datasets also allow institutional researchers to identify how different groups of institutions are experiencing shifts in degree conferrals across fields, including liberal arts institutions and non-selective institutions.

References

Brooks, D. (2013, June 20). The humanist vocation. *New York Times*, A23.

Carnevale, A.P., Cheah, B., & Strohl, J (2012). *Hard times*. Washington, DC: Georgetown University Center on Education and the Workforce.

Carnevale, A. P., Strohl, J., & Melton, M. (2011). *What's it worth.* Washington, DC: Georgetown University Center on Education and the Workforce.

Florida Blue Ribbon Task Force on State Higher Education Reform. (2013). Working Draft. Retrieved from http://www.slideshare.net/FLHigherEd/working-draft-brtf4dot0

Goudreau, J. (2012, October 11). The worst college majors. *Forbes.* Retrieved from http://www.forbes.com/sites/jennagoudreau/2012/10/11/the-10-worst-college-majors/

Harpaz, B. J. (2013, July 9). Many colleges offering more help with career prep. *Associated Press.* Lewin, T. (2013, October 30). As interest fades in the humanities, colleges worry. *New York Times*. Retrieved from http://www.nytimes.com/2013/10/31/education/as-interest-fades-in-the-humanities-colleges-worry.html?src=rechp&_r=0

Markley, S. (2013, January). Crafting a career curriculum. National Association of College and University Business Officers. Retrieved from http://www.nacubo.org/Business_Officer_Magazine/Magazine_Archives/January_2013/Crafting_a_Career_Curriculum.html

National Association of Colleges and Employers. (2012). Effectively counseling graduating students. Retrieved from http://www.careeradvisoryboard.org/public/uploads/2012/09/Effectively-Counseling-Graduating-Students_Report-FINAL.pdf

Pryor, J. H., Eagan, K., Palucki Blake, L., Hurtado, S., Berdan, J., & Case, M. H. (2012). The American freshman: National norms fall 2012. Los Angeles, CA: Higher Education Research Institute, University of California Los Angeles.

Pryor, J. H., Hurtado, S., Saenz, V. B., Santos, J. L., & Korn, W. S. (2007). The American freshmen: Forty year trends. Los Angeles, California: Higher Education Research Institute.

Rapacon, S. (2013, September). Best college majors for a lucrative career. *Kiplinger.* Retrieved from http://www.kiplinger.com/slideshow/business/T012-S001-10-best-college-majors-for-a-lucrative-career/index.html

Silver, N. (2013, June 25). As more attend college, majors become more career-focused.

U.S. Department of Education, National Center for Education Statistics. (2012). *Digest of Education Statistics, 2011* (NCES 2012-001),Chapter 3_.

Vedder, R., Denhart, C., & Robe, J. (2013). Why are recent college graduates underemployed? Center for College Affordability and Productivity.

Woodford, A. (2012, April 18). Up close: Humanities face identity crisis. *Yale Daily News.* Retrieved from http://yaledailynews.com/blog/2012/04/18/up-close-humanities-face-identity-crisis/

Zhang, B. C. (2013, February 13). CS leads concentration growth in SEAS. *The Crimson.* Retrieved from http://www.thecrimson.com/article/2013/2/13/cs-seas-more-concentrators/

TIMING IS EVERYTHING: WHAT WE CAN LEARN FROM "SURVEY PROCRASTINATORS"

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Abstract

Web-based surveys help institutions quickly and inexpensively acquire necessary survey data, yet plummeting response rates have left us vulnerable to non-response bias. Sending survey reminders can be helpful if the newly-recruited participants, albeit late to respond, help us avoid this bias. This study examines differences between early, late responders ("procrastinators"), and non-responders for two large surveys of undergraduates in two differently-incentivized conditions. Procrastinators were characterized by greater dissatisfaction, less engagement with faculty, and less engagement with the survey itself. Additionally, late responders in highly incentivized situations are likely to be non-responders to low incentive surveys. Analysis supports the use of reminders to improve response rate.

Introduction

Institutions rely heavily on survey data to achieve planning, assessment, reporting, and quality assurance goals (Gonyea, 2005; Porter, 2004b). The advent of web-based surveys has allowed institutional researchers to inexpensively distribute surveys to thousands of potential respondents with a single click, and to analyze data quickly and easily. Web-based surveys not only reduce cost and improve data collection processes, but they afford busy student respondents the luxury of completing surveys in comfort and at their convenience. Additionally, many web surveys have the capacity to save a student's progress, allowing for re-entry at a later time without sacrificing previously-entered data. Giving students the flexibility to complete surveys wherever and whenever they wish assumes that we will get better data when students have time to thoughtfully consider each question in a comfortable location.

However, evidence challenges this assumption: student survey response rates are declining, and precipitously (e.g., Dey, 1997; Jans & Roman, 2007; Curtin, Presser, & Singer, 2005). Because we rely so heavily on data collected from student surveys, plummeting response rates are quite concerning. Low response rates often – though not always – result in a sample that does not adequately represent the population from which it was drawn (Pike, 2008). Samples that are sufficiently dissimilar from the population can lead to *non-response bias*¸ where researchers draw erroneous conclusions about the data (Cook, Heath, & Thompson, 2000; Dalecki, Whitehead, & Blomquist, 1993). Survey data that represents only vocal minorities are bound to be problematic.

Why might a student fail to respond to surveys? Web surveys might make non-response more likely given that emailed invitations and reminders could be accidentally routed to spam

folders. Or they might encourage forgetfulness – a student who intends to complete a survey at another time may forget to follow through. These students are non-responders, but passively so. In contrast, active non-responders are students who refuse to do surveys under all but the most exceptional of circumstances.

To combat low response rates, and in turn, poor data quality, we send survey reminders, which are as easy to distribute as the original survey invitations. In doing so, we attempt to intervene in passive non-responding. In other words, we give the students who are willing to take surveys a second chance to follow through. However, are students who need reminders to cue their participation different than those who did not need reminders? If so, then ensuring that our passive non-responders have ample opportunity to complete surveys is an important strategy in avoiding non-response bias.

Extant research on these late responders – or "procrastinators" – is limited in scope and presents mixed findings. These limited findings suggest that late responders are almost always male (e.g., Aviv, Zelenski, Rallo, & Larsen, 2002; Stevens & Ash, 2001), and they may be prone to troubling behavior, such as low GPA (Bender, 2007; Nielson, Moos, & Lee 1978) or reported substance abuse (Kypri, Stephenson & Langley, 2004). Yet a consistent picture of the survey procrastinator is still elusive.

This study addresses three research questions: Are survey procrastinators different from those who do surveys right away? If so, how are they different? Finally, how does survey incentive impact procrastination?

Methodology

Data for this study came from two annual student experience surveys administered to sophomores enrolled in the School of Arts and Sciences at Tufts University during the 2012 and 2013 spring semesters ("Sophomore Survey"). Survey questions are developed by faculty and staff to monitor student attitudes and to evaluate academic and campus services. Additional demographic and academic data, including gender, race, and GPA, came from the university's data warehouse.

The 2012 Sophomore Survey was administered to 1151 sophomores. Of this population, 1073 students began the survey, resulting in a response rate of 93.3%. The survey instrument contained 63 items assessing a variety of topics, including satisfaction with advising, participation in campus activities and community service, satisfaction with campus services, and engagement with faculty. Although the majority of the items on the survey were scored on a 4-point or 5-point Likert scales, several items employed a check-all-that-apply, multiple-choice, or open-ended format.

The 2012 Sophomore Survey was highly incentivized. Students who started the survey were allowed to begin the registration process for their fall semester classes in advance of the university's registration date. Students choosing not to participate in the survey did not get this advantage. Students received an initial email inviting them to participate in the survey. Two weeks after receiving the initial email, students received the first reminder; a second reminder was issued two weeks after the first.

The 2013 Sophomore Survey was administered to 1123 sophomores, and was began by 718 sophomores; the response rate was 64.0%. The survey instrument had been revised significantly following a review process and contained 51 items assessing a similar range of

topics and in similar formats as in 2012. Although many items were similar on both surveys, the 2013 instrument asked fewer questions about advising and more questions about student wellbeing. Additionally, the survey was decoupled from registration for the first time; students who completed the survey could enter a raffle to win prizes. Students received an initial survey invitation, followed by a series of 6 reminders. These reminders were issued at intervals averaging 120 hours apart.

Procrastination was defined as a survey response begun only after a reminder had been issued. The time stamp on the data generated by the web-based survey platform was used to identify early and late responders.

Results

Ad hoc analyses were conducted to test for differences between respondents and non-respondents, and then to test for differences between early and late responders.

2012 Survey

In the highly incentivized, high response rate 2012 survey, there were no significant differences in academic and demographic variables across responders and non-responders.

Of the responders, 58.7% were categorized as "early responders" by virtue of having started the survey prior to the issuance of a reminder. The remaining 41.3% of respondents were designated as "survey procrastinators." Early responders and procrastinators differed significantly on two demographic variables and one academic variable. Compared to the sample of early responders, more men ($\chi^2 = 16.91$, $p < .001$) and more nonwhite students ($\chi^2 = 14.26$, $p <$

.001) were procrastinators. Additionally, procrastinators had a significantly lower GPA than did early responders ($t = 7.35$, $p < .001$).

Procrastinators also differed from non-responders on several survey variables. They reported more difficulty choosing a major ($t = 2.06$, $p < .05$), they were less likely to make an appointment to see their academic advisor ($t = 2.22$, $p < .05$), and more likely to drop in to see their advisor at the last minute ($t = 6.81$, $p < .01$). Procrastinators were less engaged with faculty; they were less likely to have asked faculty for a letter of recommendation ($\chi^2 = 9.76$, $p < .01$) or for academic advising ($\chi^2 = 4.53$, $p < .05$) than early responders. Additionally, procrastinators indicated that they were less likely to participate in student organizations ($t = 2.99$, $p <.01$) and demonstrated more dissatisfaction with their overall Tufts experience compared to early responders ($t = 1.85$, $p < .05$). Finally, procrastinators took less time to complete the survey than did early responders ($t = 2.39$, $p < .05$). Tables 1 and 2 display the relevant demographic, academic, and survey variable means, and results of chi-square and t-test analyses for the 2012 survey.

2013 Survey

In the low incentive 2013 survey, there were more male non-responders than there were male responders ($\chi^2 = 34.70$, $p < .001$). Additionally, the mean GPA for non-responders was lower than that of responders ($t = 4.20$, $p < .001$). No significant differences in racial composition between the groups were observed.

Of the responders, 48.7% started the survey before the first reminder. There were no significant differences between early responders and procrastinators on the two demographic variables (gender and race) or on GPA. Procrastinators did, however, differ from early

responders on a number of survey variables. They reported being less likely to ask a faculty member for a letter of recommendation ($\chi^2 = 4.69$, $p < .05$) or for educational opportunities outside of Tufts ($\chi^2 = 4.55$, $p < .05$). They were less satisfied than early responders with the sense of community on campus ($t = -2.24$, $p < .05$) or where they lived ($t = -3.10$, $p < .01$), and were less likely to have had discussions with other students about academic topics ($t = 2.12$, $p < .05$). Additionally, when asked if they felt they were able to contribute to Tufts more as sophomores than as First Year students, non-responders were less likely to say "yes" ($\chi^2 = 4.25$, $p < .05$). Finally, procrastinators took less time to complete the survey ($t = 3.16$, $p < .01$) and were less likely than early responders to leave a comment in the final open-ended question box ("Please use the space below to provide any additional comments"; $\chi^2 = 4.12$, $p < .05$). Tables 3 and 4 display the relevant demographic, academic, and survey variable means, and results of chi-square and t-test analyses for the 2013 survey.

Discussion

In this study, survey procrastinators – those who wait for reminders before starting a survey – were different from those who choose to participate in surveys earlier. In both the 2012 and 2013 Sophomore Survey, procrastinators were less engaged with faculty, more dissatisfied. Additionally, they were less engaged with the survey process overall as evidenced by the amount of time spent answering questions and, in 2013, the willingness to leave a comment in the final open-ended question box.

Although the 2012 responders were not different from non-responders for gender, race, and GPA, these two groups were indeed different in the 2013 sample. Consistent with previous research, non-responders to the low incentive version of the Sophomore Survey were more likely

to be male and to have a lower GPA than responders. Additionally, this profile also described the late responders in the high incentive survey version. Thus, male students at Tufts with a lower GPA need a strong incentive in order to gain their participation; else they are non-responders.

Survey reminders are indeed valuable. As evidenced by the low incentive 2013 survey, where less than half the sample started the survey before the first reminder was issued (and necessitating six reminders to achieve a 64% response rate), reminders can have significant impact. Even in the high incentive condition, more than 40% of survey respondents began the survey only after receiving a reminder. Data provided by late responders allowed for a fuller picture of the sophomore experience – a picture that would have been much rosier had no reminders been issued.

Although reminders can boost the response rate of a survey, they do not fully combat the risk of nonresponse bias. Non-responders in the low-incentive survey resembled the late responders in the high-incentive survey, indicating that a strong incentive can turn non-responders into responders, albeit late ones. Still, even with a strong incentive, nearly 7% of the class did not participate in the survey -- these students are the "active non-responders" described earlier who will not participate in surveys. We must accept that some portion of the population will actively non-respond and account for this when planning survey administration.

Finally, this study indicated that even a 64% response rate – considered strong in many contexts – still places data at risk for nonresponse bias. Our 2013 survey overrepresented women and students with higher GPAs, which may have implications for the conclusions drawn from the data.

Several limitations to this study should be noted. First, Tufts University undergraduates are traditional students, typically ages 18-22 and completing their bachelor's degrees in 4 years. The findings that late responders are less academically engaged and more dissatisfied may not be generalizable to students at all institutions. Additionally, other variables that were not analyzed, such as pre-matriculation traits, content of open-ended questions, or analysis of student majors. Finally, although we know who the survey non-responders at Tufts are likely to be, we know very little about *why* students choose not to participate in surveys.

References

Aviv, A. L., Zelenski, J. M., Rallo, L., & Larsen, R. J. (2002). Who comes when: Personality differences in early and later participation in a university subject pool. *Personality and Individual Differences, 33*(3), 487-496. doi: 10.1016/S0191-8869(01)00199-4

Bender, T. A. (2007). Time of participation effect and grade-orientation. *Personality and Individual Differences, 43*(5), 1175-1183. doi: 10.1016/j.paid.2007.03.009

Cook, C., Heath, F., & Thompson, R. L. (2000). A meta-analysis of response rates in web- or internet-based surveys. *Educational and Psychological Measurement, 60*(6), 821-836. doi: 10.1177/00131640021970934

Curtin, R., Presser, S., & Singer, E. (2000). The effects of response rate changes on the index of consumer sentiment. *Public Opinion Quarterly, 64*(4), 413-428. doi: 10.1086/318638

Dalecki, M. G., Whitehead, J. C., & Blomquist, G. C. (1993). Sample non-response bias and aggregate benefits in contingent valuation: An examination of early, late and non-

respondents. *Journal of Environmental Management, 38*(2), 133-143. doi: 10.1006/jema.1993.1034

Dey, E. (1997). Working with low survey response rates: The efficacy of weighting adjustments. *Research in Higher Education, 38*(2), 215-227. doi: 10.1023/A:1024985704202

Gonyea, R. M. (2005). Self-reported data in institutional research: Review and recommendations. *New Directions for Institutional Research, 2005*(127), 73-89. doi: 10.1002/ir.156

Jans, M., & Roman, A. (2007). National response rates for surveys of college students: Institutional, regional, and design factors. Paper presented at the 62nd Annual Conference of the American Association for Public Opinion Research, Anaheim, CA., Anaheim, CA. https://www.amstat.org/sections/srms/Proceedings/y2007/Files/JSM2007-000360.pdf

Kypri, K., Stephenson, S., & Langley, J. (2004). Assessment of nonresponse bias in an internet survey of alcohol use. *Alcoholism: Clinical and Experimental Research, 28*(4), 630-634. doi: 10.1097/01.alc.0000121654.99277.26

Nielsen, H. D., Moos, R. H., & Lee, E. A. (1978). Response bias in follow-up studies of college students. *Research in Higher Education, 9*(2), 97-113. doi: 10.1007/BF00977392

Pike, G. R. (2008). Using weighting adjustments to compensate for survey nonresponse. *Research in Higher Education, 49*(2), 153-171. doi: 10.1007/s11162-007-9069-0

Porter, S. R. (2004b). Raising response rates: What works? *New Directions for Institutional Research, 2004*(121), 5-21. doi: 10.1002/ir.97

Stevens, C. D., & Ash, R. A. (2001). The conscientiousness of students in subject pools: Implications for "laboratory" research. *Journal of Research in Personality, 35*(1), 91-97. doi: 10.1006/jrpe.2000.2310

Table 1

Demographic and survey variables for 2012 early responders and procrastinators

	Early responders		Procrastinators		
	n	%	*n*	%	$\chi^2(1)$
Male survey participants	232	39.6	208	52.9	16.91***
Nonwhite students	147	24.4	146	35.4	14.26***
Have asked faculty for a recommendation	327	53.5	186	43.7	9.76**
Have asked faculty for help with academic decision making	469	76.8	302	70.9	4.53*

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 2

Academic and survey variable means for 2012 early responders and procrastinators

	Early responders		Procrastinators			
	M	*SD*	*M*	*SD*	*t*	*p*
Mean GPA	3.48	0.33	3.31	0.40	7.35	< 0.001
Number of minutes to complete survey	134.7	479.7	90.9	297.3	2.39	0.017
How difficult was it for you to choose a major? [a]	2.50	1.16	2.64	1.15	-2.01	0.045
I generally made an appointment to see my pre-major advisor [b]	3.17	0.75	3.07	0.75	2.21	0.027
I usually stopped to see my pre-major advisor at the last minute [b]	1.93	0.75	2.26	0.84	-6.81	< 0.001
How often have you participated in activities sponsored by a student organization? [c]	3.10	0.89	2.93	0.95	2.98	0.003
If you had the chance to relive the college choice process, would you choose to attend Tufts again? [d]	4.01	1.01	3.90	1.02	1.85	0.049

[a] The scale used for this item was: 1 = Very easy, 2 = Easy, 3 = Neither easy nor difficult, 4 = Difficult, 5 = Very difficult

[b] The scale used for this item was: 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree

[c] The scale used for this item was: 1 = Never, 2 = Occasionally, 3 = Often, 4 = Very often

[d] The scale used for this item was: 1 = Definitely not, 2 = Probably not, 3 = Maybe, 4 = Probably, 5 = Definitely

Table 4

Demographic and survey variables for 2013 early responders and procrastinators

	Early responders		Procrastinators		
	n	*%*	*n*	%	$\chi^2(1)$
Male survey participants	128	36.6	152	41.3	1.69
Nonwhite students	93	30.8	91	29.7	0.80
Have asked faculty for a recommendation	205	63.1	175	54.7	4.69*
Have asked faculty for additional educational opportunities outside of Tufts	128	39.5	101	31.5	4.55*
Do you feel you are able to contribute more to the Tufts community now than as a First Year student? (% yes)	295	51.3	280	48.7	4.25*
Wrote in final comment box (% yes)	98	28.0	79	21.5	4.12*

* $p < .05$

Table 4

Academic and survey variable means for 2013 early responders and procrastinators

	Early responders		Procrastinators			
	M	*SD*	*M*	*SD*	*t*	*p*
Mean GPA	3.45	0.37	3.43	0.38	0.84	0.402
Number of minutes to complete survey	40.18	68.54	26.17	40.46	3.16	0.002
How satisfied are you with the sense of community on campus? [a]	2.75	0.75	2.88	0.89	-2.24	0.025
How satisfied are you with the sense of community where you live? [a]	2.69	0.89	2.90	0.82	-3.10	0.002
How often have you had discussions with students about academic topics? [b]	3.49	0.64	3.38	0.69	2.12	0.035

[a] The scale used for this item was: 1 = Very dissatisfied, 2 = Dissatisfied, 3 = Satisfied, 4 = Very satisfied

[b] The scale used for this item was: 1 = Never, 2 = Occasionally, 3 = Often, 4 = Very often

UNDERSTANDING THE LEAKY STEM PIPELINE BY TAKING A CLOSE LOOK AT FACTORS INFLUENCING RETENTION AND GRADUATION RATES

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Introduction

Student retention has been increasingly recognized as a critical issue by American colleges and universities since the early 1970s [1]. Retention is directly related to student educational attainment and time to degree completion. Therefore, graduation rates are often used by the public and government to measure the success and effectiveness of higher education institutions [2, 3]. A number of previous studies have focused on the persistence and graduation rates of underrepresented minority students, students with lower socioeconomic status, and first-generation students [4-8]. However, there are not many studies quantifying the retention and graduation performance for freshmen with aspirations to obtain their degree in a STEM (Science, Technology, Engineering and Mathematics) discipline, despite the fact that STEM has become one of the progressively hot topics inside higher education and for funding initiatives in recent years. According to a 2010 University of California-Los Angeles study [9], there is a substantial number of undergraduates across the country choosing to leave STEM programs before they graduate with a STEM degree, and many students who start in those STEM programs struggle to finish their degree within four years, or drop out. This loss after college admission is critical given the efforts to enhance STEM enrollment due to the growing demands of a highly skilled workforce and the shortage of STEM graduates production from our colleges and universities [10, 11].

Previous studies on retention have found that a student's decision to remain at an institution is due to personal characteristics, academic background, and integration into the academic and social life of the campus [12]. A number of researchers have linked academic ability and achievements with students' persistence in college [13]. In addition to the background of students, the characteristics of the institution are also relevant to students' persistence and success. Adequate financial aid, individual academic support systems, better social and cultural support systems, and a welcoming campus environment were also found to promote retention. Whether these risk factors from traditional attrition models also play a role in students' decision to change their majors from STEM to Non-STEM have not been fully understood.

Methodology

The Consortium for Student Retention Data Exchange (CSRDE) at the University of Oklahoma has expanded the main CSRDE survey to include an optional survey which summarizes and benchmarks the retention and graduation rates of first-time full-time freshman cohorts majoring in STEM. In our study, data from the CSRDE main and STEM surveys for the 2007-2011 cohorts are used to compare first to second year retention rates of the entire entering cohorts of first-time full-time freshmen: institution-wide and discipline-specific for STEM students of the same entering cohort.

The analysis uses data from five historical fall entering first-time full-time freshman cohorts, 2007 to 2011. Depending on which detailed retention and graduation measurements are being compared, different entering cohorts are used for rate calculations. For example, for the second year retention rates, all five cohorts can be used. However, the four-year graduation rate can only be generated for the 2007 and 2008 cohorts.

The CSRDE STEM survey defines which disciplines are to be considered STEM and uses the 2010 CIP codes for further definition. The 2010 CIP codes representing STEM disciplines include 03.XXXX, 11.XXXX, 14.XXXX, 15.XXXX, 26.XXXX, 27.XXXX, 40.XXXX. Additionally, it also includes 01.0000, 01.0801, 01.09 through 01.9999 and 30.1901. According to the CSRDE STEM survey definitions, a total of 87 academic plans at the University of Delaware are flagged as STEM disciplines, among which more than 50% are from the College of Engineering or the College of Arts and Sciences.

In general, retention outcome is whether a first-time full-time freshman is retained from the first fall to the second fall semester. STEM institution-wide retention outcome is reflecting whether entering students majoring in a STEM discipline are retained in any major (STEM or Non-STEM) in the following fall semester. In contrast, STEM discipline specific retention outcome is measuring whether entering students majoring in a STEM discipline are persisting in *any* one of the STEM majors. For this latter outcome, either students who didn't enroll or students enrolled in non-STEM majors are regarded as non-retained under the discipline specific retention definition.

The four-year graduation outcome is the primary graduation outcome of interest. Similar to the retention rates, the three types of graduation rates are representing (1) the percentage of first-time full-time freshmen who completed their degree in four years; (2) the percentage of STEM entering students who completed their degrees in any field in four years; and (3) the percentage of STEM entering students who completed their degree in one of the STEM disciplines in four years. In the third outcome, if a STEM entering student fails to graduate before the 5^{th} fall with a

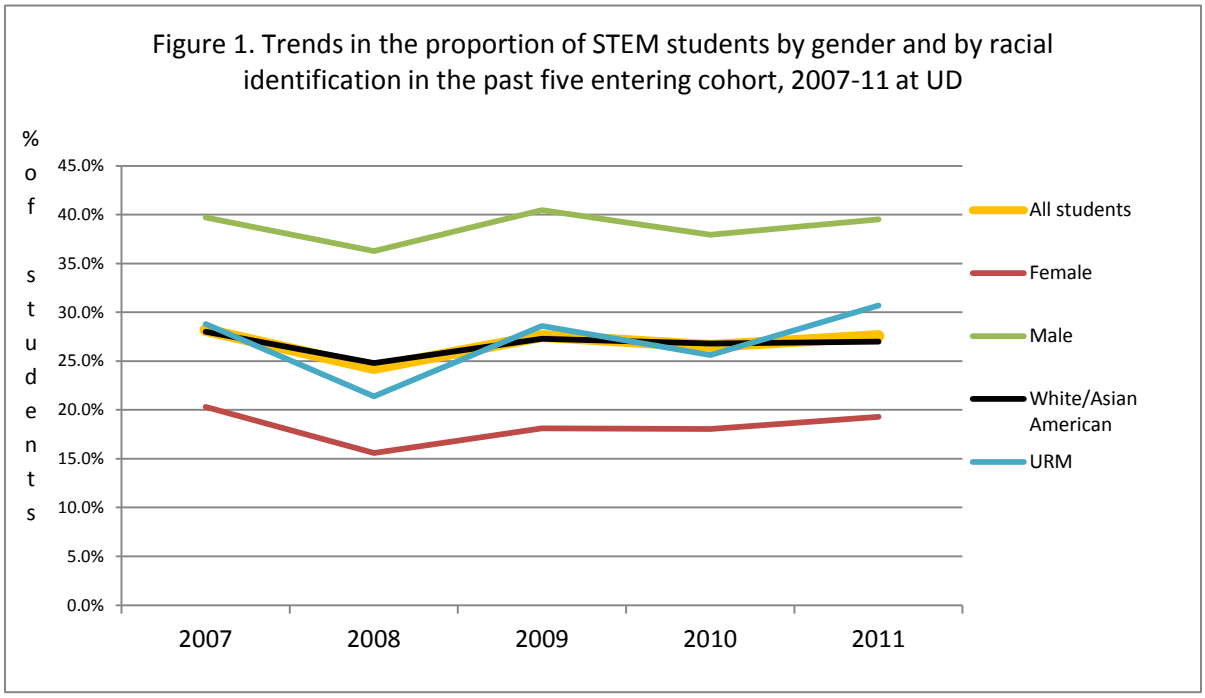
STEM degree they are regarded as non-graduated under the discipline specific graduation definition.

The percentage descriptive statistics are calculated to compare the three types of retention rates and graduation rates overall, by gender, and by race/ethnicity. Multinomial logistic regression analyses were performed among the STEM entering students to evaluate the potential risk factors relating to increased partial odds of changing to Non-STEM major as opposed to persisting in STEM programs from the first fall to the second fall. The STEM entering students in all five entering cohorts are used for the analyses. Factors being evaluated include demographic factors (gender, race, age, residency), socioeconomic factors (low income, Pell Grant, first generation), academic background (honor student, SAT scores), and which college initially enrolled in. Odds ratios (OR) after adjusting for cohort effect and 95% confidence intervals (CI) are used as indicators of the strength of association. A p-value less than 0.05 is considered as statistically significant throughout the study.

Results

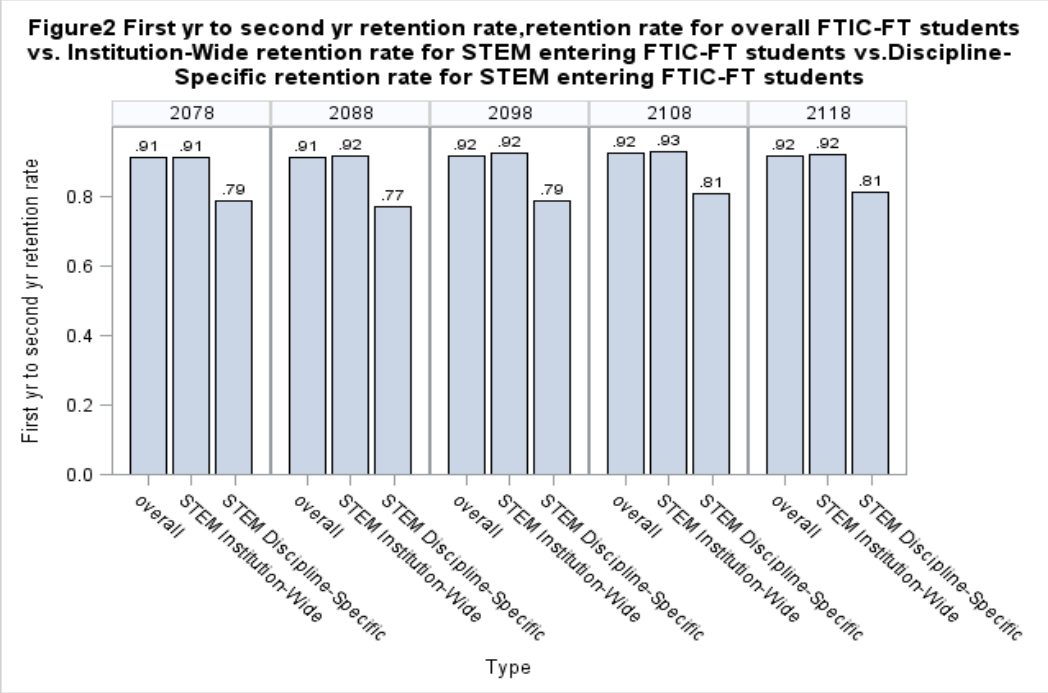
The sample population from the past five entering cohorts is 18,143, among which 4,873 (26.9%) students are initially majoring in a STEM discipline. The sample size of the five cohorts is consistent, ranging from 3,365 (2010 cohort) to 3,905 (2011 cohort). Over the past five years, the overall proportion of STEM students in the entering cohorts has been relatively stable, fluctuating between 24.3% and 27.6%. Male students far outpace their female peers majoring in a STEM discipline throughout the entire five entering cohorts. There is a slightly upward trend for the Underrepresented Minority group (URM) starting with a STEM major from 2007 to 2012

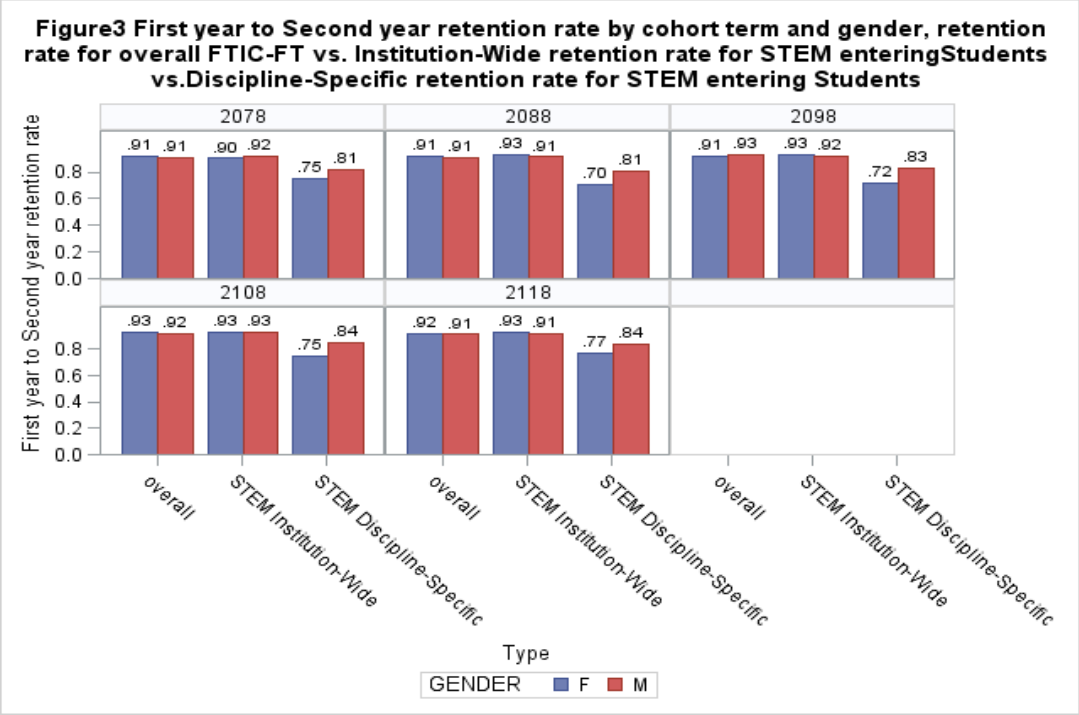
(Figure 1), which is likely the result of recent STEM recruitment initiatives or the increasing number of Non-Resident Aliens at the University of Delaware.

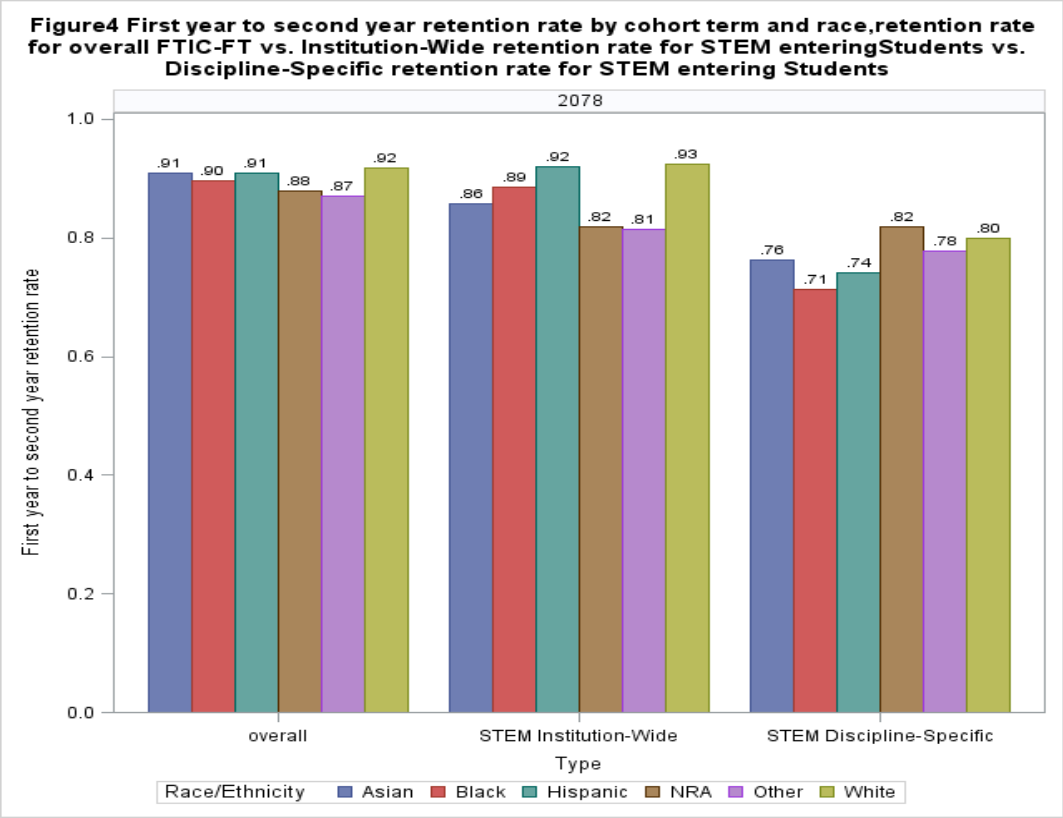


Figures 2 to 4 show the comparison of three types of Year1 – to-Year2 retention rates by cohort only, by cohort and gender, and by cohort and race (only 2007 data are presented). The retention rates for the entire five entering cohorts of first-time full-time freshmen are consistently above 90% at UD. There is no doubt that the STEM entering students, if not outperform, performed as well as well as overall first-Time full-time freshmen with regard to the Institution-wide retention rates. However, when comparing that with the discipline specific retention rates, the retention rates for STEM entering students drops by an average of 13% across the five cohorts, indicating essentially 13% additional STEM-specific attrition among those STEM entering students (Figure 2). Although females tend to have slightly higher retention rates for overall first-time full-time freshmen and higher institution-wide retention rates for STEM entering students, they invariably lag behind males with respect to STEM discipline-specific retention performance across all five

cohorts (Figure 3). Both African-Americans and Hispanics are subject to the highest proportion (18%) of STEM-specific attrition from the first fall to the second fall semester.

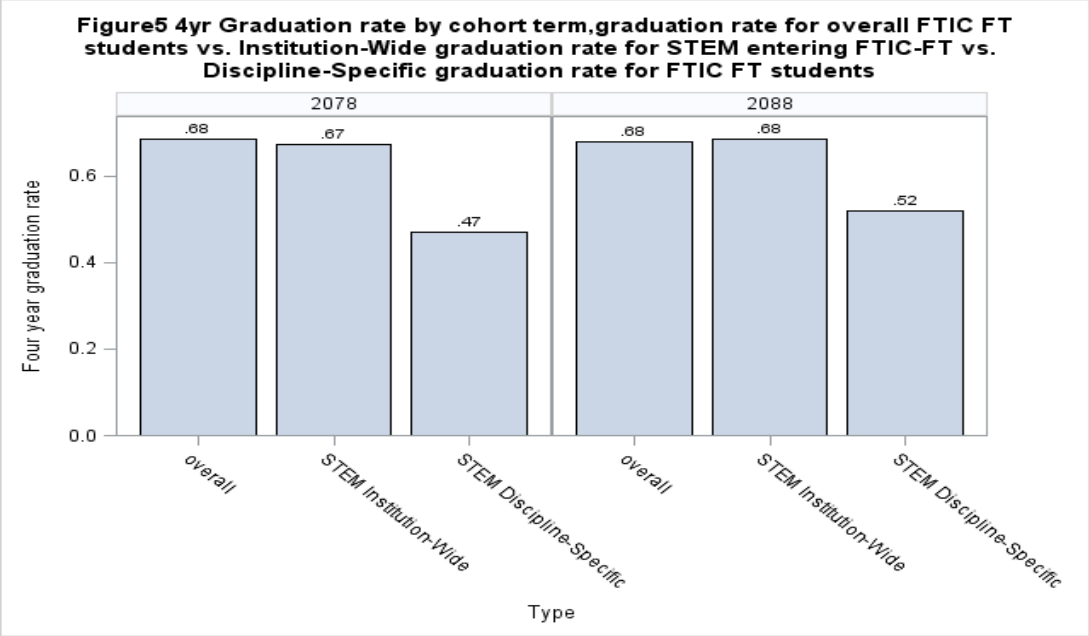


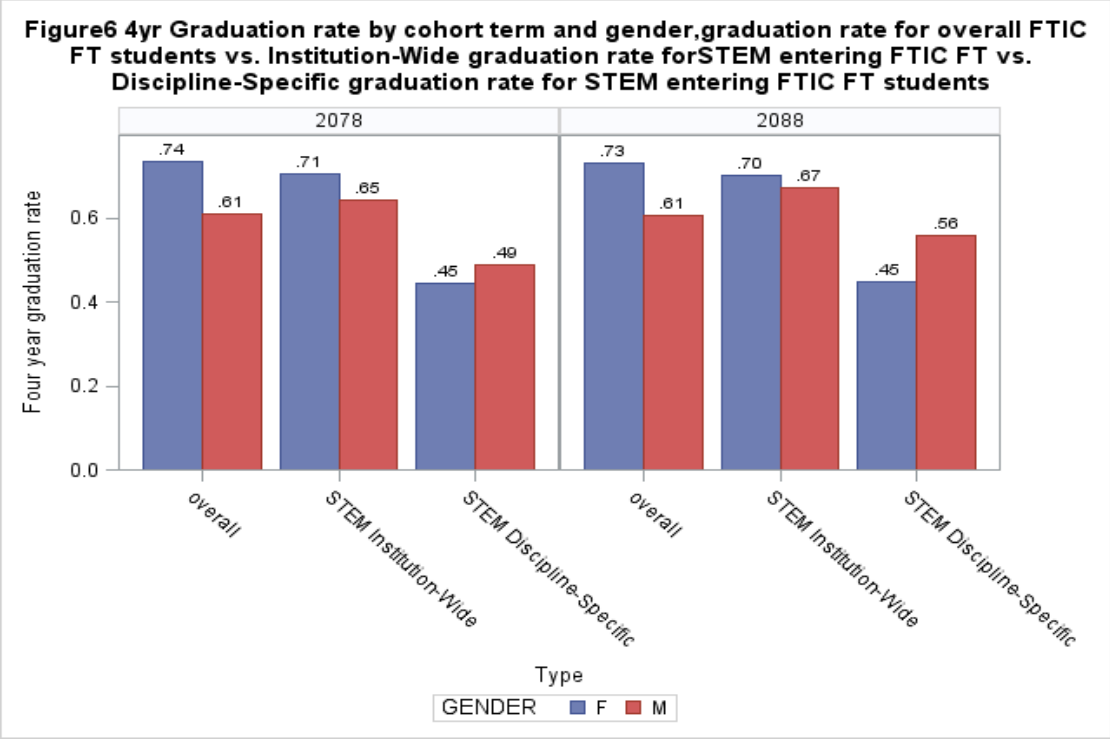


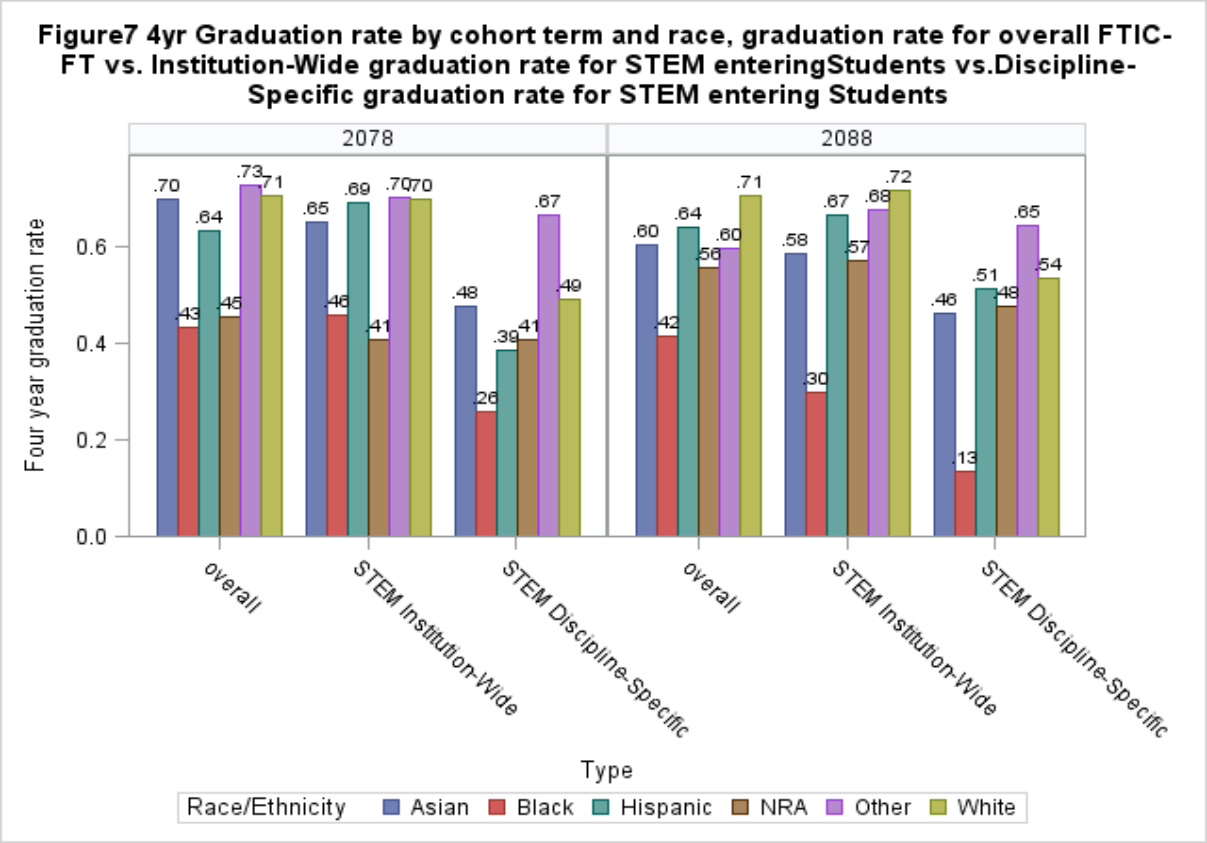


Approximately 68% of the entire five cohorts of first-time full-time freshmen graduated within four years. A similar proportion of STEM entering students graduated from any major within four years, while only close to 50% of them graduated with a STEM degree within four years (Figure 5). Similar to retention rates, in comparison to males, females have higher four year graduation rates for one of the two cohorts of first-time full-time freshmen and the subset of STEM entering students, if not taking into consideration what degree they completed. In contrast, STEM entering males outpace their female peers in the percentage of obtaining a STEM degree within four years (Figure 6). There is great variation in the four year graduation rates for different race/ethnicity groups. African-Americans are far behind others in all three types of measurements for four-year graduation rates. STEM entering Hispanics are likely to have higher four-year graduation rates graduating from any major than the overall Hispanic subpopulation.

STEM entering Non-Resident Aliens seem to have the highest proportion of graduates with a STEM degree, but their overall graduate rates are less than 50% (Figure 7).







A total of 4,488 (92.1%) out of 4,873 STEM entering first-time full-time freshmen persist in the second year, among which 3,866 (86.1%) continue to major in one of the STEM programs at UD. Individual factors significantly associated with higher risk for changing to Non-STEM majors as opposed to persisting in a STEM program include being a female, being a Delaware resident, being the first person in their family to attend college, having a SAT math score less than 650; while Non-Resident Aliens/International students, Honors students, or students who started their STEM program in the College of Engineering seem less likely to switch their major to non-STEM (Table 1).

Although STEM-specific attrition is not a favorable outcome, it may indicate whether students were able to receive sufficient academic advising when they realized a STEM major was not a good fit. In that sense, female students, Delaware residents, and Honors students are more likely

to change to non-STEM programs relative to dropping out. However, International students and students with an initial STEM program in the College of Engineering are more likely to drop out as opposed to change to a non-STEM major (Table1).

Table1 Relationship between individual factors and the likelihood of changing to Non-STEM majors

Factors		Partial Odds Ratio* (95% Confidence Interval)	
		out of STEM vs. persist in STEM	out of STEM vs. discontinue
Gender	Female vs. Male	2.2(1.9,2.6)	2.1(1.6,2.7)
Race/Ethnicity	Asian vs. White	1.0(0.7,1.4)	1.1(0.6,1.8)
	Black vs. White	1.2(0.8,1.8)	0.6(0.4,1.1)
	Hispanic vs. White	1.0(0.7,1.4)	0.7(0.4,1.3)
	NRA vs. White	0.4(0.2,0.7)	0.3(0.1,0.6)
	Other[1] vs. White	0.7(0.4,1.2)	0.7(0.4,1.4)
Underrepresented	Yes vs. No	1.1(0.8,1.4)	0.7(0.5,1.0)
International Student	Yes vs. No	0.4(0.2,0.7)	0.3(0.1,0.6)
Residency	in-state vs. out of state	1.3(1.1,1.5)	1.7(1.3,2.3)
Pell grant receiver	Yes vs. No	1.3(1.0,1.7)	0.7(0.5,1.0)
First generation	Yes vs. No	1.4(1.1,1.8)	0.9(0.6,1.2)
Low income	Yes vs. No	1.1(0.7,1.7)	0.6(0.4,1.1)
Honor student	Yes vs. No	0.7(0.5,0.8)	1.7(1.2,2.4)
SAT Math score	<650 vs. >=650	2.1(1.8,2.5)	1.2(0.9,1.5)
SAT Reading score	<600 vs. >600	1.1(0.9,1.4)	0.8(0.6,1.0)
College originally enrolled in	Agriculture vs. Engineering	1.9(1.3,2.7)	1.9(1.1,3.2)
	Arts&Sciences vs. Engineering	3.4(2.8,4.2)	3.0(2.3,4.0)
	Health Science vs. Engineering	13.1(6.2,27.6)	3.4(1.2,9.6)
	Earth Ocean vs. Engineering	2.5(1.7,3.8)	3.3(1.6,6.8)

[1] Other includes race/ethnicity unknown, multi-ethnic, American Indians, Native Hawaiians and Pacific Islanders

* All odds ratios were controlled for the cohort effect.

Conclusion/Discussion

Without question, science and engineering capability will be the foundation of economic success for the U.S. in the 21st century. According to the U.S. Bureau of Statistics, in the next five years, STEM jobs are projected to grow twice as fast as jobs in other fields. Based on this projection, the U.S. will have over 1 million job openings in STEM-related fields by 2018. Yet only 16% of graduates in U.S. will specialize in STEM (data from U.S. Bureau of Statistics). Apparently, our education system is not preparing enough STEM majors to meet the demand. The results of this study visually underscore the leak in the STEM education pipeline for higher education. The gender and racial differences in STEM retention rates and graduation outcomes are highlighted as well. This study calls for the need to regularly track STEM discipline-specific retention and graduation rates to raise concerns and attention among senior administrators, especially for institutions with impressive overall retention and graduation rates.

Students' personal characteristics and academic background have significant impact on their decisions to persist in STEM programs. It is interesting to know that students who begin a STEM program in the College of Engineering are less likely to change to a non-STEM program, compared to other STEM entering students. This may be due to the fact that males are largely overrepresented in the College of Engineering or the College is providing better academic support services. Females still lag behind in representation of both the STEM entering and STEM graduating populations. Compared to their male peers, STEM entering females are subject to more STEM specific attrition after college admission, although they are less likely to drop out from the University. There are multiple theories to explain the gender gap including the test based theories, biological determination theories, cognitive learning difference theories, and

social-psychological theories [14].Future studies focusing on assessing students' attitudes and beliefs about women in STEM-related disciplines will be helpful to better understand the loss of female STEM graduates.

References

1. South Carolina Univ. Columbia. National Resource Center for the Freshman Year Experience., et al., *Portals of Entry University Colleges and Undergraduate Divisions. The Freshman Year Experience. Monograph Series Number 12*, 1993, Distributed by ERIC Clearinghouse: [S.l.]. p. 134.
2. Asmussen, J.G. and University of Minnesota. Educational Policy and Administration., *Why does the graduation rate productivity of U.S. public universities vary? Looking outside their boundaries for answers*, 2010.
3. Walsh, T.A. and Educational Resources Information Center (U.S.), *Identifying Peer Institutions for Graduation Rate Comparisons. AIR 2000 Annual Forum Paper*, 2000, Distributed by ERIC Clearinghouse: [S.l.]. p. 18.
4. Baskin, D.M. and The University of Wisconsin - Madison., *The influence of pre-college interventions on underrepresented minority student persistence and graduation: Evidence from a Midwest comprehensive university*, 2008.
5. Davis, J., *The first-generation student experience : implications for campus practice, and strategies for improving persistence and success*. 1st ed. 2010, Sterling, Va: Stylus. xviii, p. 221.
6. Gary, C.F., Jr. and Purdue University. Educational Studies., *College persistence for first-generation low-income students: A phenomenological investigation*, 2008.

7. Kim, E. and University of Illinois at Urbana-Champaign., *Navigating college life: College transition experiences and persistence of minority immigrant students*, 2008.
8. Nurse, E.A., *The impact of mentoring on the persistence of minority students at the University of Wisconsin-Madison*, 1994, University of Wisconsin--Madison, 1994. p. xii, 140 leaves.
9. UCLA, *Bachelor's Degree Completion Rates among Initial STEM majors*, 2010.
10. Business-Higher Education Forum, Educational Resources Information Center (U.S.), and Business-Higher Education Forum., *Aligning Higher Education STEM Production with Workforce Demand through Professional Master's Degrees. BHEF Issue Brief*, 2011, Distributed by ERIC Clearinghouse: [S.l.]. p. 4.
11. Business-Higher Education Forum, Educational Resources Information Center (U.S.), and Business-Higher Education Forum., *Meeting the STEM Workforce Challenge Leveraging Higher Education's Untapped Potential to Prepare Tomorrow's STEM Workforce. BHEF Policy Brief*, 2011, Distributed by ERIC Clearinghouse: [S.l.]. p. 6.
12. Tinto, V., *Leaving college : rethinking the causes and cures of student attrition*. 2nd ed. 1993, Chicago ; London: University of Chicago Press. xv, p. 296.
13. Johnson, N.T., R.C. Richardson, and Educational Resources Information Center (U.S.), *A Causal Model of Academic Factors Affecting Student Persistence*, 1986, Distributed by ERIC Clearinghouse: [S.l.]. p. 29.
14. Campbell, P.B., et al., *Upping the Numbers Using Research-Based Decision Making To Increase Diversity in the Quantitative Disciplines*, 2002, Distributed by ERIC Clearinghouse: [S.l.]. p. 22.

USING NATIONAL BENCHMARKING ASSESSEMNT

TO INFORM STUDENT LEARNING OUTCOMES

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Abstract

Benchmarking, the process of comparing an institution's performance against other institutions, provides unique opportunities to identify strengths and weaknesses. In this paper, we discuss the value benchmarking brings to program review and how Cambridge College has used benchmarking information to produce actionable data. We discuss how we shared that information with decision-makers and faculty/staff, leveraged the peer benchmarks to gain additional resources, improvements in student learning outcomes, lessons learned, and future plans.

Introduction

Program review is a process of determining the current state of a program by providing credible evidence collected from key stakeholders (e.g., students, faculty, administrators, alumni, employers). Conducting a program review requires the development of a systematic method of analyzing components of an instructional program, including instructional practices, aligned and enacted curriculum, student work samples, formative and summative assessments, professional development and support services, and administrative support and monitoring. A critical component of program review is assessment of student learning outcomes. Palomba and Banta (1999) wrote that assessment is the systematic collection, review, and use of information about educational programs undertaken to improve student learning and development.

Institutions assess programs for many reasons namely to provide evidence of effectiveness for accreditation or performance funding and to justify resource allocations, but most importantly, to understand their program’s strengths and weaknesses in order to improve their programs. Strong academic and student affairs programs lead to strong student outcomes.

Creating Effective Assessments

Effective assessments provide action-driven information regarding students' experiences with that program. There are three basic components to an effective assessment:

- Valuable information: The student experience is broad and program evaluations should include environmental and associated student learning outcomes. Environmental metrics could include academic advising, facilities, quality of instruction, and peer connections. Student learning outcomes should align with appropriate accreditation or professional standards.
- Reliable and valid instruments: Bad survey instruments leads to bad data; making decisions from bad data costs institutions valuable resources. Reliability and validity testing (e.g., Cronbach's alpha, test-retest, and construct validity) must be used to ensure a credible instrument is used.
- Action-based reporting: Reporting must provide information of strengths and weaknesses, changes over time, and focus the program on areas on needed improvement. Benchmarking provides needed perspective.

Benchmarking

Benchmarking is the process of comparing one's program to others' programs using defined metrics. For most institutions, the desire and willingness to learn from each other is grounded in collegiality and the commitment to improving the state of higher education as a whole (Bender, 2002). Jackson and Lund (2000) write that collaborative benchmarking in higher education is

aimed at people who have a responsibility for evaluating institutional policies, practices, and performance.

Most regional and program accreditors require assessment information in support of current processes and encourages the inclusion of external benchmarks. For example, the New England Association of Schools and Colleges (NEASC) Standard 4.54 reads "*The institution uses a variety of quantitative and qualitative methods and direct and indirect measures to understand the experiences and learning outcomes of its students, and includes external perspectives."*

Benchmarking adds perspective to an assessment project. An external view provides institutional leaders comparative data about their programs and helps answer the ultimate questions "Are we preforming well?" or "Is it possible to perform better?" or "We are performing at the top of our profession!".

EBI has created various assessment tools based on the premise that assessment is vital to continuously improving programs, especially in the area of teacher preparation education. One particular instrument, the Teacher Education Exit Assessment, was designed to benchmark assessments based on the NCATE[1] standards for program accreditation. The purpose of the Teacher Education Exit Assessment is to provide institutions insight into their program based on national standards and to target meaningful changes backed by hard data to support institutional goals of continuous improvement and accreditation. There are three benchmarking groups as part of the reporting function:

- Select 6 / Peer Institutions: A comparison of institutional results against four to six peer or aspirant institutions.

[1] NCATE and TEAC merged this past summer into CAEP. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

- Carnegie Classification Institutions: A comparison of institutional results against the institutions in the same Carnegie Class. The Carnegie Classification of Institutions of Higher Education is a framework for classifying, or grouping, colleges and universities in the United States. EBI uses the 2010 Basic Carnegie Classifications to determine an institution's classification. All institutions outside the United States are combined into an "International" Carnegie Class.
- All Institutions: A comparison of institutional results against all participating institutions. This provides a national norm or national standard.

EBI Teacher Education Exit Assessment

The EBI Teacher Education Exit Assessment measures the effectiveness of the teacher preparation program from the students' viewpoint. Over 100 colleges and universities have surveyed over 150,000 students since that assessment began in 1999. Demographic questions include gender, ethnicity, and race and additional categorical questions relate to future employment and future education. Qualitative questions ask the respondent to provide suggestions for program improvements. There are 35 seven-point Likert-scaled questions to provide feedback on environmental metrics like the student teaching experience, career services, and support services. There are 36 seven-point Likert-scaled questions to provide measures of student learning outcomes that align with CAEP, NCATE, and TEAC specialized accreditation. These 71 Likert-scaled questions collapse into 16 factors with Cronbach's alpha ranging from 0.78 to 0.95.

The principal report provided by EBI is Recommendations for Improvement. This report, the product of a multi-variant linear regression, identifies the factors which predict the students' perceptions of their experience with this program. EBI separates the factors into two groups:

- No/Low Impact Factors: These factors fail to strongly predict students' perceptions of the program. Applying additional resources to improve these areas will not improve students' perceptions of the program.
- High Impact Factors: Focusing additional resources (or reallocating other resources) to improve these factors will result in an overall improvement in students' perceptions of the program.

Cambridge College has participated in the EBI Teacher Education Exit Assessment for three years. Below we discuss how we applied those results for program improvement.

Applying Assessment Results for Improvement

Cambridge College was established by a small group of educators who created an educational institution whose primary mission was to provide educational opportunities and degrees for adult learners who did not have ready access to higher education. Founded first as a teacher's college it has grown in size and scope. Cambridge College's School of Education is broadly based, inclusive, and committed to producing quality teachers that become agents of change in their schools. It provides students with the knowledge, skills, and values to excel academically and professionally. Improving students' perceptions of our program is very important.

The College collects data, such as grades, student teaching evaluations, and state licensure test results, because of the requirements for approval by the Massachusetts Department of Elementary and Secondary Education (DESE). The College also administers the EBI Teacher Education Exit Assessment to graduates of the School of Education. Students are asked to evaluate their experience at Cambridge College in categories, such as Satisfaction with Faculty

and Courses, Classroom Equity and Diversity, and Teaching Pedagogy and Techniques. Questions from the EBI have been mapped to program specific outcomes and triangulated with data from other assessment tools.

As part of its efforts to improve its teacher preparation programs the College embarked on seeking national accreditation through TEAC. TEAC accreditation, in part, requires the submission of an auditable research brief followed up by a site audit. The research brief was focused on establishing a valid and reliable program review process. The incorporation of external perspectives and the use of benchmarking were critical components of the brief. The review of evidence and auditing revealed that the College and its School of Education require changes. Furthermore, the TEAC process has made clear that the College must maintain momentum and continue its development of a robust, accurate assessment system that imbues student-learning outcomes.

TEAC Claims

The TEAC brief starts with the College faculty stating claims regarding student-learning outcomes. The claims are:

Claim 1

Cambridge College Teacher Preparation graduates demonstrate content knowledge in their fields of Licensure.

Evidence of Content Knowledge

Claim 2

Cambridge College Teacher Preparation graduates demonstrate pedagogical content knowledge and teaching skills that promote student learning.

Evidence of teaching skills and pedagogical knowledge

Claim 3

Cambridge College Teacher Preparation graduates are diverse, caring adult educators trained to meet the educational needs of their students.

Evidence of diverse and caring educators

Mapping the EBI and Using Data for Continuous Improvement

As an online survey Cambridge College administers to graduates of the School of Education, the EBI. The survey asks students to evaluate their experience at Cambridge College in categories, such as Satisfaction with Faculty and Courses, Classroom Equity and Diversity, and Teaching Pedagogy and Techniques. As mentioned previously, the survey uses a 1-to-7 Likert scale whereby1 equals strong disagreement/very poor and 7, strong agreement/exceptional. The mean response for each question is then reported as a percentage performance in which 1, 4, and 7 equate with 0%, 50%, and 100% performance, respectively.

The EBI survey sets a goal for institutional respondent performance of 75% or higher. Additional close-ended questions, such as gender, race, ethnicity, and plans after graduation, are also asked to provide demographic background. Each scaled question is reported with reference to the background information of the student respondents for that particular question. The College uses the measures of peer institution comparisons through Select 6, Carnegie Class, and All Institutions rankings. The Select 6 used by the College in 2010-2011, were American International College, McKendree University, Metropolitan College of NY, University of Wisconsin-Stout, and Fort Hays State University.

In 2011-2012 Cambridge College selected McKendree University, Metropolitan College of NY, Fort Hays State University, and Oral Roberts University. The Carnegie Class consisted of EBI-designated institutions within the same tier as Cambridge College whose performance is reported in aggregate. Thirteen institutions were reported in 2010-2011 and seventeen in 2011-2012. We also used the EBI analysis and benchmarking against all institutions that participated in the survey. Cambridge College's responses were compared to forty-four institutions in 2010-2011 and thirty-four in 2011-2012.

We use the EBI to study graduates' satisfaction with our teacher preparation programs as well as mapped its questions to state standards and the TEAC Quality Principles and Cross-Cutting Themes.

Categories	Correspondence: State Standards	Correspondence: TEAC
Subject Matter/Pedagogical Knowledge	A: Plans Curriculum and Instruction B: Delivers Effective Instruction C: Manages Classroom Climate and Operations	
Meets Professional Responsibilities	D: Promotes Equity E: Meets Professional Responsibilities	Cross-Cutting Themes of Learning How to Learn, Technology, and Multicultural Accuracy
Satisfaction with Program Components and Cambridge College Administration		Third Quality Principle
The questions provide feedback about the quality of instruction and candidate support.		

Results of the EBI Benchmarking to TEAC Claims

In 2010-2011 the survey response rate (the number of responses divided by the number of attempted responses) for Cambridge College was 48.4% (n_{2011}=316, N=652). The overall number of graduates in the K-12 licensure program was more than 43% (n=281). In 2011-2012 the responses rate was 39.4% (n=320, N=808). The overall number of completers in the K-12 licensure program during this period was more than 29% (n_{2012}=289).

Generally, the highest rates reported by graduates in both years were with the quality of faculty and courses (in 2012 the scores for performance of 86.7% satisfaction with a high-score of 90.7% for average class size). They also report high scores with the interactions they had with

fellow students in the program (86.7%) and Classroom Equity and Diversity (80.5%). As an institution founded on the principles of andragogy this is a critical learning outcome in the program[2].

Our EBI analysis identifies two topics for the College to focus its time, energy, and resources: Impact on Overall Program Satisfaction and Level of Program Satisfaction. Impact on Overall Satisfaction indicates the degree to which the factor, if improved, will increase. Overall Satisfaction. Improvement in high impact factors will have the greatest affect on Overall Satisfaction. Level of Satisfaction describes the degree of satisfaction students reported with a particular factor: the lower its level, the greater the opportunity for improvement. The most efficient and effective way to improve program quality is to concentrate on improving factors likely to have greatest impact and factors due to the lowest performance. The high impact factors identified by the EBI analysis include:

Item	Contribution to Total: %
Quality of Instruction	30.3
Student Teaching	20.9
Support Services	18.7

Although classified as having a no or low impact, Career Services reportedly was the only factor that scored significantly below the goal and, therefore, was included in our analysis as a low satisfaction indicator. Furthermore, Overall Program Effectiveness, while not a high impact or low satisfaction indicator, was included in our analysis because it provides a holistic representation of a student's experience.

[2] Andragogy is the methods or techniques used to teach adults as advanced by Malcolm Knowles. The process focuses on engaging adult learners with the structure of learning experience.

Overall Program Effectiveness

Overall Program Effectiveness on average achieved a 5.32 average rating (n_{2012}=289), falling shy of the 5.5 goal but not yet falling into an area a concern (5.25 or lower). When disaggregated by M.Ed. Licensure program concentration, the programs that scored the indicator lowest were:

- within .25 of goal (5.5):
    - English as a Second Language (5.47, n=86)
- lower mean than goal (5.5) by more than 2.5:
    - Elementary Teacher (4.62, n=91)
    - Mathematics (4.29, n=26)
    - Health/Family & Consumer Service (3.89, n=16)

Overall Program Effectiveness increased (0.10, n_{2012}=289) in 2012 versus 2011and exceeded the scores of the Carnegie Class and All EBI Institutions. It scored nearly equal with Cambridge College's Peer Institutions.

Quality of Instruction

As the highest impact indicator, Quality of Instruction scored slightly below the factor performance with 5.45 (n_{2012}=289). Within Quality of Instruction, only the Feedback on Assignments sub-question scored below the goal with an average rating of 5.29 (n_{2012}=289). When disaggregated by M.Ed. Licensure program concentration, the programs that scored the indicator lowest are:

- within .25 of goal (5.5):
    - English as a Second Language (5.33, n=86)
    - Special Education/Moderate Disabilities (5.49, n=94)

- lower mean than goal (5.5) by more than 2.5:
    - Health/Family & Consumer Service (4.42, n=16)
    - Mathematics (4.75, n=26)
    - Elementary Teacher (5.06, n=61)

Quality of Instruction increased (.03, n_{2012}=289) in 2012 versus. 2011 and exceeded the scores of the Carnegie Class and All EBI Institutions. It scored nearly equal to Cambridge College's Peer Institutions. Overall, the data suggest that Cambridge College is improving its quality of instruction.

Student Teaching Experience

As the second-highest impact factor, Student Teaching Experience generally scored above the goal for factor performance at (6.17, n_{2012}=289). All of the sub-questions within the indicator met or exceeded the 5.5 goal. When disaggregated by M.Ed. Licensure program concentration, all programs scored above 5.5.

Student Teaching Experience remained constant in 2012 versus 2011, increasing by (0.01, n_{2012}=289). While four of the sub-questions showed an increase in satisfaction between 2011 and 2012, the remaining questions, process of securing a position, and choice of assignments decreased by (0.13, n_{2012}=289) and (0.21, n_{2012}=289), respectively. Student Teaching Experience exceeded the scores of the Carnegie Class and All EBI Institutions. It scored nearly equal with Cambridge College's Peer Institutions.

The data suggest that, although Student Teaching Experience at Cambridge College is excellent, some attention should be given to improving securing a position and the choice of assignments.

Support Services

As the third high-impact factor, Support Services scored above the goal for factor performance at (5.64, n_{2012}=289). Within Support Services, only the Training to Utilize Education School's Computing Resources sub-question scored below the goal with an average rating of (5.46, n_{2012}=289).

When disaggregated by M.Ed. Licensure program concentration, no programs scored the indicator between 5.25 and 5.5. Those programs that scored the indicator lower mean than goal (5.5) by more than 2.5 are:

- Elementary Teacher (4.88, n=61)
- Health/Family & Consumer Service (4.89, n=16)
- Special Education/Moderate Disabilities (5.12, n=94)

Support Services decreased by (0.11, n n_{2012}=289) in 2012 vs. 2011. The majority of this decrease came from the question, Quality of Library Resources, which declined (0.17, n_{2012}=289) between 2011 and 2012. Support Services exceeded the scores of the Carnegie Class and All EBI Institutions. However they fell below the average for Cambridge College's Peer Institutions.

The data suggest that, although support services at Cambridge College are generally excellent, special attention should be paid to training for the school's computing resources and the quality of library resources, especially the Elementary Teacher, Health/Family & Consumer Service, and Special Education/Moderate Disabilities programs.

Career Services

Although a no or low impact factor, Career Services was the only other to score consistently in concern (4.36, n_{2012}=289). Within Career Services, all of the sub-questions were average scores that fell within the our concern (lower than 5.5 by more than .25):

- number of schools recruiting on campus (4.00, n_{2012}=289)

  quality of schools recruiting on campus (4.02, n_{2012}=289)
- number of interviews had with employers (4.23, n_{2012}=289)
- notice of job openings (4.26, n_{2012}=289)
- assistance in preparing you for your permanent job search (4.72, n_{2012}=289)

When disaggregated by M.Ed. Licensure program concentration, the programs that scored the indicator lowest are:

- within .25 of goal (5.5):
    - Mathematics (5.38, n=26)
    - School Administration (5.40, n=30)
- lower mean than goal (5.5) by more than 2.5:
    - Elementary Teacher (3.36, n=61
    - Special Education/Moderate Disabilities (3.84, n=94)
    - English as a Second Language (4.04, n=86)

Ratings for Career Services decreased by 0.28 (n_{2012}=289) in 2012 vs. 2011. By question, the largest decrease between 2011 and 2012 is:

- Quality of schools recruiting on campus (-0.39, n_{2012}=289)
- Number of schools recruiting on campus (-0.31, n_{2012}=289)
- Number of interviews you had with employers (-0.31, n_{2012}=289)

Career Services was on par with the scores of the Carnegie Class and All EBI Institutions. However, it fell below the average for Cambridge College's Peer Institutions.

While Career Services is not a high impact factor, the low satisfaction rankings make it a priority for Cambridge College, which recently hired a career counselor to assist students.

NCATE Unit and University Teacher Education Program Standards

In addition to analysis by factor, the EBI results reported on external benchmarks for NCATE Unit Standards and Standards for University Teacher Education Programs. For all the questions reported for NCATE Unit Standards, Cambridge College exceeded its Peer Institutions, Carnegie Class, and All EBI Institutions scores. The following questions the Program scored below its Peer Institutions:

- To what degree does your Education course work enhance your ability to effectively develop a lesson plan and
- Availability of Education School's Computers.

Similarly, of all of the questions reported for University Teacher Education Program Standards, Cambridge College exceeded its Peer Institution, Carnegie Class, and All EBI Institutions scores with the exception of the question, "To what degree does your Education course work enhance your ability to Effectively develop a lesson plan," where it scored below them.

Recommendations for Improvement and External Benchmarking

Through the Recommendations for Improvement report, three factors were identified as areas of focus to improve students' perceptions of our program.

- 1st Predictor - Quality of Instruction: Our program performed well against the institutions in our Carnegie Class and all participating institutions but we were statistically equal to

our peer institutions. The lowest mean question in that factor focused on the quality of feedback on assignments.

- 2nd Predictor - Student Teaching Experience: All metrics met or exceed the goal value (mean of 5.50 on a 7-point Likert scale) but the lowest item was "How satisfied were you with the process of securing a position"? In addition, our program performed well against the institutions in our Carnegie Class and all participating institutions but we were statistically equal to our peer institutions.
- 3rd Predictor – Support Services: While our program performed well against the institutions in our Carnegie Class and all participating institutions, we did not perform well in comparison to our peer institutions. The lowest mean question in this factor focused on training to utilize students' use of computing resources.

Ten factors were listed as not being a strong predictor of students' perceptions of the program. All factors, except for Career Services, met or exceeded the goal value (mean of 5.50 on a 7-point Likert scale). Career Services was the lowest performing factor in the study.

Reviewing the external benchmarking results, we found we performed well exceptionally well against the three benchmarking groups on the factor "Satisfaction with Faculty and Courses" and performed lower-than-desired on two factors: Assessment of Student Learning and Career Services.

Actionable Results

Combining the results of the Recommendations for Improvement with results against our external benchmarking groups, we created our action plan which focused on four factors:

- Career Services (lowest performing, lowest comparison with external groups)
- Quality of Instruction (1st Predictor)

- Student Teaching Experience (2nd Predictor)
- Support Services (3rd Predictor)

For each factor, we asked ourselves two questions "How important is this to our teaching goals?" and "How do we want to measure to see if we are meeting our teaching goals?" We concluded that the design of a functioning quality control system could not begin until a close examination of the current processes and policies used to develop curriculum and implement the education licensure programs had been undertaking. With these results, in part, the Program Chairs and a handful of administrative staff formed three committees: The Academic Advising Committee, The Academic Oversight Committee, and The Student Files and Records Committee. Each was tasked with unraveling the current academic processes and questioning the validity of outcomes. The overall responsibility and accountability for each area was examined and mapped.

Next, the Program Chairs reviewed their curriculum. Course curriculum and student learning outcomes rely on the knowledge and skills students are expected to demonstrate. Each Chair mapped student learning outcomes to state and national standards. Program matrices were created for each program showing the relationship among program outcomes, Massachusetts DESE Professional Teaching Standards, national or Special Professional Associations (SPA) standards, TEAC Claims/Standards, course assignments, and key assessments. The information and data acquired from the assessment of outcomes was used in curriculum design and program improvements.

Without these steps, no reliable quality control system could be identified or redesigned. We wanted to establish consistency, clarity, and confidence in our academic processes and identify the data to establish the internal audit and resulting quality control. Like many institutions,

Cambridge College has been implementing academic programs using a multitude of individual systems and processes reflecting historic precedence and individual preference, best practices created to address quality standards notwithstanding.

Over this past year, faculty and administrators have worked tirelessly to create, improve, and update program and course outcomes, course syllabi, practicum, key assessments, admission processes, matriculation policy, academic advising, and handbooks. All areas were assessed to ensure consistency, clarity, and relevance to state and national standards while maintaining the mission of Cambridge College.

Summary

Assessment is critical to provide evidence of effectiveness and for program improvement. Creating effective assessments must be reliable, contain metrics that matter, and must drive action. Applying that assessment information to practice provides opportunities to improve programs and the student experience.

References

Bender, B., (2002). "Benchmarking as an Administrative Tool for Institutional Leaders". New Directions for Higher Education, n. 118.

Carnegie Classifications of Institutions of Higher Education.
http://classifications.carnegiefoundation.org/

Jackson, N., Lund, H., Ed. (2000). "Benchmarking for Higher Education". Taylor & Francis, Inc. Florence, KY.

Palomba, C & Banta T. (1999). *Assessment essentials: planning, implementing, and improving assessment in higher education*. San Francisco Jossey Bass.

Principles and Categories for Improving Academic Quality. Higher Learning Commission. 2008. http://www.ncahlc.org/AQIP-Categories/aqip-categories.html