

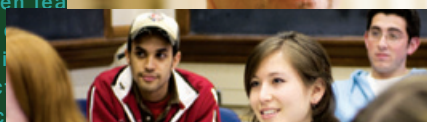
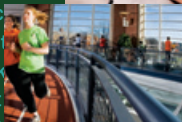
# National Institute for Learning Outcomes Assessment

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## Connecting the Dots Between Learning and Resources

Jane V. Wellman

Foreword by Peter T. Ewell



Occasional Paper #3

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## Abstract

### Connecting the Dots Between Learning and Resources

American higher education is being challenged as never before by the imperative to increase postsecondary access and degree attainment despite declines in funding. The challenge is made all the more daunting because of the rapid changes in student demographics. Meeting these challenges without harming quality will require unprecedented attention to the intersection of resource use and performance. Almost every institution is currently struggling to find ways to restructure its costs, a painful exercise that requires hard thinking about priorities and spending. Institutional and policy leaders are asking for guidance, and for data that tells them something about how to focus scarce resources in areas that make the biggest difference in access, attainment, and learning outcomes.

They're not getting much help: despite nearly two decades of increased attention to learning assessments, we have yet to cross the rubicon of connecting the dots between educational practices that promote student learning with the way that funds are used. For all the good work that has been done in the assessment of student learning, little parallel attention has been given to questions of cost-effectiveness and to the difference that money either does or does not make in getting students to degrees with acceptable levels of learning. Conventional assumptions about college finances, including the assumption that more money means better quality, appear to be so commonly held that they are not seriously analyzed by institutions or addressed by researchers. The problem occurs on both sides of the equation, with not enough attention in work on student success to clear measures of learning outcomes and not enough attention on the cost side to the connection between spending levels or patterns and student academic success.

To get a better handle on what is known and the much that remains to be discovered, this paper presents a conceptual approach for analyzing the relation of spending to student success, followed by an examination of what the existing research says about the topic. Since there is so little work directly on the topic of learning and resource use, this paper searches other areas of work for threads that might be sturdy enough to be woven into a fabric of knowledge about learning and resources. The paper concludes by recapping the research themes and by suggesting directions for future work.

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## Foreword

In February 2009, President Obama called upon the nation's colleges and universities to significantly increase the proportion of citizens with a postsecondary credential. Reaching this goal will be especially challenging under the best of conditions and even more difficult because the current recession has significantly reduced the amount of resources available to colleges and universities. One essential step will be for the academy to better understand the relationships between costs and such outcomes as degrees earned and enhanced levels of learning. These relationships have always been obscure for higher education. When college leaders are asked how much money they need to operate, the typical response is “more” or “as much as our peers.” Little serious consideration usually is given to how much of what kind of resource does the institution require to reach or maintain a given level of output or performance.

No one is better qualified than Jane Wellman to chart this territory. As leader of the Delta Cost Project, she has focused extensively on the costs of higher education for the past two years. And in a long and distinguished career as a policy analyst at the state and national level she has advised on policies and projects as varied as planning and resource allocation to accreditation and quality assurance.

The first thing needed for so vast an undertaking is a conceptual scheme to describe the many ingredients of cost, the equally varied range of postsecondary outcomes, and the potential relationships between them. This is necessary in part because the literature on higher education productivity is itself so varied. The distinct bodies of work that Wellman then reviews in the light of this conceptual scheme include theoretical treatments of costs, empirical work on institutional cost patterns, survey work on perceptions of costs by policy leaders and the general public, research connecting institutional spending and results, research on student aid and its effects, treatments of faculty teaching effectiveness, inquiries into individual and social return on investment, and work exploring the concept of “learning productivity.”

A number of important points emerge from this sweeping review. A first, somewhat surprising, observation is the relative paucity of work that actually examines postsecondary productivity. Fewer than a dozen studies Wellman reviews looked at the relationship between costs and outputs directly—a condition that begs for more attention. A second important insight is the way conclusions about cost-effectiveness can change markedly when the metric applied is not the traditional cost-per-enrollment but a measure that is far more relevant to Obama's goal, cost-per-degree. Among the somewhat surprising conclusions of accomplishing this shift is that, contrary to popular public policy belief, community colleges are not cheap when it comes to cost-per-degree. A third leitmotif is the power of activity-based costing models in revealing—so ultimately diagnosing and restructuring—higher education's “production function” for teaching and learning. The course redesign work of the National Center for Academic Transformation (NCAT) provides Wellman's clearest illustration of the applications of activity-based costing, while simultaneously providing an illustration of the power of directly connecting cost calculations with assessed learning outcomes. A final important insight—again against the grain of conventional wisdom—is that simply investing more money does not appear to produce more or better outcomes. Improved student learning will occur only if such investments are directed and intentional.

Wellman thus demythologizes more than a few things that policy and institutional leaders thought they knew about the connection between costs and results. She also offers cogent advice about what further lines of inquiry should look like. In lifting some of the fog from a broad and murky landscape, she has done us all a great service.

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# Connecting the Dots Between Learning and Resources

Jane V. Wellman

## The Challenge: Increasing Learning and Degree Attainment Despite Funding Declines

For the better part of the last 15 years, leaders in American higher education have been working to improve student success, focusing particularly on assessment of learning outcomes and getting more students to degrees. Despite frustration at the slowness of change and continued debate about learning goals and measures, most would agree that the assessment trend has taken hold—that important questions are being asked and that serious work is being done. But progress in translating good intentions into improved educational practices is at risk of being erased by another dominant trend in American higher education: eroding fiscal support, course reductions, layoffs, higher tuitions, budget cuts, and reductions in educational access.

The funding challenges facing American higher education are not going to go away soon. Although some level of revenue growth should return when the recession ends, resources will not likely return to the level of support enjoyed by previous generations (Boyd, 2009). Almost every institution is being forced to look at ways to change its cost structures, to align spending with revenues in a way that avoids permanent damage to institutional and public priorities. As part of this, leaders are asking questions about the relationship between spending and success and about how to allocate scarce resources for the greatest payoffs in student learning and degree attainment.

There's the rub. Not much evidence exists on the relationship between resources and institutional performance, particularly as it relates to improvements in student learning and degree attainment. For all the good work that has been done in the assessment of student learning, little parallel attention has been given to questions of *cost-effectiveness* and to the difference that money either does or does not make in getting students to degrees with acceptable levels of learning. Conventional assumptions about college finances, including the assumption that more money means better quality, appear to be so commonly held that they are not seriously analyzed by institutions or addressed by researchers. The problem occurs on both sides of the equation, with not enough attention in work on student success to clear measures of learning outcomes and not enough attention on the cost side to the connection between spending levels or patterns and student academic success.

To get a better handle on what is known and the much that remains to be discovered, this occasional paper presents a conceptual approach for analyzing the relation of spending to student success, followed by an examination of what the existing research says about the topic. Since there is so little work directly on the topic of learning and resource use, this paper searches other areas of work for threads that might be sturdy enough to be woven into a fabric of knowledge about learning and resources. The paper concludes by recapping the research themes and by suggesting directions for future work.

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## A Conceptual Framework for Thinking About Cost-Effectiveness

Most measures of costs in higher education are measures either of revenues (such as tuition or state appropriations) or inputs (revenues per student or faculty salaries) rather than measures of how resources are used. Ideally, to look at cost-effectiveness, one would look at the role of funds in producing educational value added, or the translation of inputs into outputs. Such a look would require better ways to evaluate learning than are currently available as well as better ways to look at how funds are used within institutions.

In the absence of ideal measures, a number of proxies can be created that measure different dimensions of spending in relation to types of outcomes. On the cost side, variables include measures of how institutions apportion money between functions (such as between instruction and research or academics and student support) and measures of how labor resources are used, particularly for faculty and student service personnel. Cost analysis can also look at revenues to get a sense of the volume of resources available as well as the proportion of funds controlled within the institution rather than by outside funders. On the outcomes side, proxies for learning outcomes include measures of credits earned, year-to-year retention, degree or certificate completion, and lifetime earnings.

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Cost Variables	Outputs
<ul style="list-style-type: none"> <li>• Spending per student or total revenues from all resources</li> <li>• Spending per student from unrestricted resources only</li> <li>• Spending per student by functional area (e.g., for instruction, student services, financial aid)</li> <li>• Spending per student for education and related expenses only (excluding sponsored research and public service and auxiliary enterprises)</li> <li>• Trends over time in spending and by functional area</li> </ul>	<ul style="list-style-type: none"> <li>• Credits earned</li> <li>• Completion of 12 units or more</li> <li>• First-year retention</li> <li>• Degrees completed</li> <li>• Certificates completed</li> <li>• Transfer from a two-year to a four-year institution</li> <li>• Job placement rates</li> <li>• Pass rates on examinations such as the GRE or licensure examinations</li> <li>• Lifetime earnings</li> </ul>

Using this framework one can imagine a number of ways to connect topics on the cost side of the matrix to the outputs side, to look at spending in relation to different measures of performance. For instance, one would learn something about spending and performance by evaluating changes over time in spending for instruction in relation to rates of retention or the number of students completing 12 or more units or the number of degrees or certificates earned. These measures could be generated within a single institution or used to compare (appropriately comparable) institutions.

## A Scan of the Existing Research Literature

### Theoretical Work on Institutional Costs

Some of the most prominent work on higher education costs is theoretical rather than empirical, beginning with the seminal work on the service sector “cost disease” by William Baumol and William Bowen (1966), who argued that costs in the service sector inevitably rise as labor costs increase because the work in that sector cannot be made more productive without harming its quality. To make this point, they offered the example of the string quartet, which requires four instruments and four musicians and cannot be produced more cheaply by eliminating one of the parts. Taking this “cost disease” theory a step further in his early research, Howard Bowen (1980) said that higher education costs are a function of revenue availability. In his “revenue theory of college costs” he argued that in the absence of ways to evaluate quality colleges and universities tend to treat revenue as a surrogate for quality—creating an incentive structure such that institutions inevitably seek to increase revenues to expand quality, and so unless revenues dry up costs inevitably increase.

### Empirical Work on Cost Patterns

Outside the theoretical work on college spending, a relatively small literature on revenue and spending patterns in higher education has produced consistent findings about the primary factors that determine costs or spending levels. Again, this work concentrates on funding patterns and inputs and not on spending in relation to any measure of outcomes. Clotfelter (1996), Winston and Zimmerman (2000), Pew Policy Perspectives (1990), Winston (2000), and Zemsky, Wegner, and Massy (2005) have all looked at revenue and spending patterns among selective private institutions and research universities and have consistently found evidence of cost growth, driven largely by competition for resources and reputation. The pattern among elite institutions is that competition increases spending, primarily because of the costs of faculty research and merit-aid for students. This was described as the phenomenon of the “academic ratchet” in the 1990 essay “The Lattice and the Ratchet” produced by the Pew Higher Education Research Program:

[The academic ratchet] is a term to describe the steady, irreversible shift of faculty allegiance away from the goals of a given institution, toward those of an academic specialty. The ratchet denotes the advance of an entrepreneurial spirit among faculty nationwide, leading to increased emphasis on research and publication, and on teaching one’s specialty in favor of general introduction courses, often at the expense of coherence in an academic curriculum. Institutions seeking to enhance their own prestige may contribute to the ratchet by reducing faculty teaching and advising responsibilities across the board, enabling faculty to pursue their individual research and publication with fewer distractions. The academic ratchet raises an institution’s costs, and it results in undergraduates paying more to attend institutions in which they receive less attention than in previous decades. (pp. 4-5)

Studies of revenue and spending patterns also show consistent and wide variations in costs depending on an institution’s mission, funding structure, and program mix (Bowen, 1980; McPherson, Schapiro, & Winston, 1993; National Commission on the Cost of Higher Education, 1999; National Center for Education Statistics, 2001). Research universities, public and

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private, have the highest average costs per student, largely because faculty compensation includes funding for “departmental research” in the form of reduced teaching loads as well as higher support levels for graduate and professional education. Private nonprofit institutions on average have more revenues per student than do public institutions, principally from higher tuitions and endowments. Costs per student are typically lowest in community colleges, which are heavily dependent on state and local appropriations and where most states have kept tuition low to maximize access. Among public institutions as well as in many private research universities, undergraduate education costs are lower than upper division costs, which are lower than costs for graduate and professional education. Since most high-cost programs do not have dedicated sources of revenue to support them, they are funded through internal reallocations known as “cross-subsidies.”

The mix of programs offered by an institution also drives costs; the sciences and laboratory-based disciplines consistently require more in spending than language and literature or other humanities (Middaugh, 2002). Among the professions, the health sciences are by far the most costly, followed by engineering. Despite the relatively inexpensive instructional costs of their large class sizes, law and business have come to be expensive, because of high faculty salaries. Education, particularly teacher education, has historically been a low-cost discipline.

Many analysts argue that cost structures are determined by institutional spending priorities as much as by intrinsic requirements for spending and that these priorities often devalue undergraduate education in favor of graduate education and research (Jones & Wellman, 2009; Pew Policy Perspectives, 1990). Boyer (1990), among others, used this analysis to argue for changing the tenure reward system to recognize scholarship in teaching and learning as equivalent to research as a basis for faculty promotion.

### **Studies of Public and Policy-maker Perceptions of Costs**

Opinion research shows that the public—and most policy makers—have a lopsided and somewhat inaccurate view about spending in higher education. Perhaps this is because the cost literature is so thin or because articles on elite private or research universities dominate media attention. Whatever the reason, the public thinks that institutions have much more money than they really have and for the most part that tuitions generate profits subsequently lavished on high-priced faculty and administrators. Distinctions between public and private institutions and different types of institutional missions—so central to institutional self-perception and evaluation within the academy—are invisible, or maybe just irrelevant, to the public. The public—and most policy makers—do not think about the relationship between prices and costs, and negative reactions to tuition increases have become a flashpoint for criticism about higher education spending priorities. Surveys of public perceptions about prices show that the public consistently overestimates the price of college and underestimates the availability of financial aid. Despite widespread public support for higher education and growing awareness of the importance of higher education to our country’s future, the public believes institutions are spending money in ways that further institutions’ self-interests rather than in ways that help students go to college and learn. A slight majority believes that institutions could reduce spending without hurting quality (Ikenberry & Hartle, 2000; Immerwahr, 1999; Immerwahr & Johnson, 2007).

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As evidenced in surveys and other opinion research conducted with elected officials, leaders in the philanthropic community, newspaper editors, and other opinion leaders (Immewahr, 1999), the critique about college costs is even sharper among policy elites, who are inclined to think that institutions are either unwilling or unable to manage costs and that they pursue institutional prestige as a higher priority than meeting public needs. The critique that faculty workload and tenure are at the center of the “cost disease” also persists, with calls to give greater attention to cost management and productivity rather than increase funding. A letter to the U.S. Secretary of Education from Charles Miller (2006), then chairman of the Spellings Commission on the Future of Higher Education, bluntly sums up this view:

Of particular serious concern to me is the dysfunctional nature of higher education finance. In addition to the lack of transparency regarding pricing, which severely limits the price signals found in a market-based system, there is a lack of the incentives necessary to affect institutional behavior so as to reward innovation and improvement in productivity. Financial systems of higher education instead focus on and reward increasing revenues—a top line structure with no real bottom line. (p. 8A)

While his view was widely considered biased within higher education, this (to be sure) pejorative framing of the “cost disease” is not that different from the research work of Baumol, Bowen, Clotfelter, Winston, Zemsky, Wegner, and Massy. Moreover, this framing is most accurate with respect to elite institutions and institutions in the research sector—which, although clearly the ones with the most money to spend, are in the minority across the country.

### Research on Institutional Spending and Performance

A few studies in the research literature focus squarely on spending and performance as measured by student degree attainment and effective teaching practices. Most of these are efforts to apply statistical analysis to establish causal relationships between resources and some measure of educational outcomes. Two studies by researchers Patrick Kelly and Dennis Jones, of the National Center for Higher Education Management Systems (NCHEMS), evaluate aggregate levels of education and related spending per student (e.g., excluding spending on organized research, auxiliary enterprises, and public service) in relation to degrees produced and to labor force value as measured by subsequent earnings. In the first study, Kelly and Jones (2005) looked at aggregate revenue and spending data for public institutions, organized by institutional system and state, to see whether spending makes a difference in access, in state-level degree productivity, or in research funding. Recognizing that these measures say nothing about quality, the researchers found no consistent relationship between levels of spending and any of the measures of performance. The performance of states with relatively low levels of spending per student, like Colorado, was almost identical to that of the much better funded public institutions, like the University of North Carolina, on the proportion of the adult population being served by higher education, on the number of degrees produced relative to enrollment levels, and on funding for sponsored research. Although their major finding was that funding levels overall do not explain differences in performance, Kelly and Jones found that spending on student support services does correlate with higher levels of degree attainment. Their research suggests that the way resources are used may matter as much as or more than the absolute level of funds available.

In the second study, Kelly (2009) compared the same measure of institutional spending to state-level earnings data to develop a rough measure of

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spending productivity through a translation of spending into the economic value of the degrees a college or university produces. The labor-market assessment showed wide variations in spending productivity, again with no consistent pattern across states but with interesting variations between them. The study concludes that different types of market outcomes are not explained by different spending levels and that some states produce a consistently higher return than other states on the public investment.

The Delta Cost Project has produced a data set to present periodic reviews of spending patterns across higher education and to document trends in spending in relation to different measures of results. Using a panel of roughly 1,000 public and private institutions, organized into Carnegie classifications, this database is designed to invite more researchers to look at spending in relation to different aspects of performance—a comparison that has been difficult largely because the finance data are so difficult to work with. The Delta trends report (2009) presents six aggregate measures of revenues and spending:

- 1) Revenues per student by source of funds, thus generating an estimate of the proportion of total revenues that are discretionary versus those that are restricted;
- 2) Spending per student by major area and patterns over time in the amount of spending going to different areas;
- 3) Spending increases measured against tuition increases to assess whether tuitions are increasing because spending is increasing or because of shifts in revenue;
- 4) Cost-price-subsidy measures, or average spending per student, and the proportion of spending subsidized either by the institution or the state and the amount paid for by student tuitions;
- 5) Education and related spending per student related to degrees or certificates attained; and
- 6) Education and related spending per student by sector measured against total enrollments by sector.

Most of these are measures of resource inputs rather than of performance; but the measure of spending per degree is similar to that used by Kelly and Jones. Over time, the Delta data show that costs per degree are consistently lowest among comprehensive institutions and are highest on average in research universities. The analysis also shows that in many states the costs per degree for public community colleges are actually higher than the costs per degree for public research universities. The reason for this is that community colleges, despite on average much lower spending levels, produce relatively few degrees in proportion to student enrollments. In these states, shifting more students to community colleges might reduce spending per student, but it would do so at the expense of cost-effective degree production—suggesting that states interested in increasing degrees in proportion to investments would get the most bang for the buck by shifting enrollments into the comprehensive sector.

Delta Cost Project data were also used in a study done by Cornell Higher Education Research Institute (CHERI) researchers Romano and Djajalaksana (2008), who compared spending and degree attainment patterns among community colleges with those of other public institutions to explore whether states could save on postsecondary costs by shifting enrollments from comprehensive or research institutions to community colleges. Adjusting national estimates with the Delta data, they compared community college costs to actual expenditures at four-year institutions for the first two years of bacca-

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laureate instruction and then compared spending at these institutions to their levels of degree attainment or transfer. The researchers found a slight cost advantage at the public comprehensive institutions over the public community colleges.

Two other studies looked at more granular institutional spending data in relation to measures of teaching performance, both using samples of institutions identified as having effective teaching practices by the DEEP (Documenting Effective Educational Practices) project of the National Survey of Student Engagement (NSSE). In the first of these studies, NCHEMS researcher Peter Ewell (2003) looked at spending levels compared to institutional effectiveness in student engagement and retention. A sample of 20 institutions identified by NSSE as outperforming peers in student engagement and retention was created, and a peer group of similar institutions was identified that had been selected for attributes similar to the DEEP institutions (size, mission, admissions selectivity). Spending per student for instruction and related expenses was then compared between the two sets of institutions. Ewell found that the more effective institutions did not spend more per student than their peers but that they did spend differently, putting proportionately more money into academic and student support than their peers did. A follow-up study from an Iowa State University team found the same thing: total spending levels evidently mattered less to effective educational practices than did the distribution of the resources within the institution (Gansemer-Topf, Saunders, Shuh, & Shelley, 2004).

Another recent study provides additional support for the theory that student services expenses make a difference in retention and degree completion of low-income students. Using panel data developed by the Delta Cost Project, CHERI researchers Webber and Ehrenberg (2009) examined the influence of spending in instruction, student services, and other areas on the graduation and first-year persistence of undergraduate students. The strongest influence they found was from student service expenditures, with the highest marginal effects for students in institutions with low admissions selectivity and high proportions of Pell grant students. Simulations of the effect of reallocation from instruction to student services showed an enhancement of persistence and graduation.

And lastly, a new National Bureau of Economic Research study (2009), by economists John Bound with Michael Lovenheim and Sarah Turner, analyzes the influence of instructional spending and incoming student academic preparation on rates of college completion. Using data from the National Longitudinal Study of the High School Class of 1972 (NLS72) and the National Educational Longitudinal Study of 1988 (NELS:88) they document a roughly 5% decline in eight-year college completion rates between the 1972 and 1988 high school cohorts. All of the decline occurred among students who initially enrolled in either a public community college or less selective public four year institutions; graduation rates actually increased over this same time period for students in private nonprofit and public selective institutions. They then analyzed the influence of incoming academic preparation (using math test scores) and institutional spending on instruction (measured by student/faculty ratios) on graduation rates. They found that almost all of the declines in graduation rates from community college were attributable to declines in the academic preparation of entering students. However, they found that academic preparation explained almost none of the declines among the public four-year sector. Instead, for these institutions, they found deteriorating finances, measured by increasing student/faculty ratios, to account for more

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than three-quarters of the change in graduation rates. This study has immediately provoked debate about whether the researchers used the correct measures for cohort graduation rates. Still, the finding about declines in spending on instruction are consistent with similar findings reported (albeit for different years) by the Delta Project's trend reports. Since this is one of the very few studies that shows any relation between instructional spending and degree attainment, it will be important to revisit these findings with more recent spending data and more refined measures of degree completion.

### **Research on Student Aid**

Research on student tuition and financial aid dominates most of the finance literature in higher education. Since tuition is a revenue source (and not a spending category), this research primarily addresses funding inputs and not how resources are used. Still, there are some consistent themes in the student aid research relevant to the role of student aid in increasing access and student success. One consistent finding is that achievement gaps between low-income students and other students are far higher in terms of college completions than in terms of measures at the point of initial college entry (Kane, 2004; McPherson, Schapiro, & Winston, 1993; Mortenson, 1998; Pell Institute, 2004). Most student financial aid programs, however, have access and not degree attainment as their primary goal. Work-study programs are an exception, and the research shows these programs have had some success in increasing degree persistence among low-income students. In addition to providing financial help, these work opportunities have the benefit of increasing student interaction with university staff and faculty and cultivating the student's identity as a member of the campus community.

A second consistent finding in the research literature relates to institutional student financial aid. Institutional resources for student aid have increased rapidly, both through the use of "tuition discounts" and in grant aid. Research shows that the majority of this has gone to "merit" aid, or aid that is distributed primarily on the basis of academic merit rather than financial need (College Board, 2008). Merit aid can be helpful to campus enrollment management, but since it goes to students who would go to college without it, merit aid has no appreciable effect on increasing college access or persistence. To work toward these goals, institutions would seem to do better by spending their limited dollars either in grant aid or in work-study programs or on programs to enhance student success.

### **Research on Faculty and Teaching Effectiveness**

As institutions work to contain costs, the use of part-time and contingent faculty has increased precipitously. The preponderance of the research literature on this topic addresses the negative impact on the professoriate itself, from lost wages and benefits to perceived loss of academic freedom. Some researchers have looked at the relationship between the use of part-time and contingent faculty and measures of student learning. Umbach (2007) surveyed faculty using data from the Faculty Survey of Student Engagement to evaluate the relationship between faculty appointment status and institutional engagement with effective teaching practices. He found that contingent, particularly part-time, status to be negatively related to faculty job performance in undergraduate education—less use of active and collaborative teaching techniques, less likelihood of challenging the students academically, less likelihood of spending time preparing for class, and less likelihood of interacting with students.

*There are some consistent themes in the student aid research relevant to the role of student aid in increasing access and student success.*



Using institution-level panel data to look at first-to-second-year persistence and graduation rates and use of part-time or nontenured full-time instructors, Ehrenberg and Zhang (2005) found that increases in nontenured and part-time faculty reduced both rates. Bettinger and Long (2004) also looked at how adjunct faculty affect student interest and course performance, using detailed data from Ohio public institutions. The Ohio study allowed matching of student unit-level data including transcripts with faculty teaching the courses, so the researchers could adjust for differences in academic preparation as well as course-taking patterns. This study found different effects depending on discipline, with an overall slight loss of student interest in the subjects for courses taken from graduate students and adjuncts compared to full-time faculty and with a slight positive effect from use of adjunct professors among disciplines with an occupational or vocational focus.

### Return-on-Investment Concepts

Some of the research literature promotes the idea of using internal return-on-investment (ROI) approaches to assessing cost-effectiveness in higher education. Unlike most ROI studies—which compare costs of degree production to the earnings of college graduates or to societal benefits from higher education—internal ROI studies look at spending per student in relation to improvements in student retention. Enrollment management consultants Noel-Levitz have produced an ROI calculator to compare the costs of interventions designed to improve retention against the additional revenues from tuition and state appropriations for retained students. This calculator is posted online at <https://www.noellevitz.com/Papers+and+Research/Retention+Calculator/>

Using the Noel-Levitz ROI calculator for their monograph, *Investing in Quality: Tools for Improving Curricular Efficiency*, prepared for the Association of American Colleges and Universities, Ann Ferren and Rick Slavings (2000) targeted academic administrators interested in finding cost-effective ways to improve student learning and identified a number of strategies for increasing academic cost-effectiveness by investing in student success, managing the curriculum, consolidating high-cost programs, and reinvesting savings in academic programs. Working with data from Radford University, they compared the costs and gains of different cost-reduction strategies and found considerably greater positive impact (in increased revenues) from increasing student retention than from such cost-cutting efforts as increasing class size or consolidating programs.

The ROI model was used most recently by the Delta Cost Project (in press) in a pilot effort with Jobs for the Future (JFF) to test the feasibility of adding costs into evaluations of student success programs. Working with a small group of institutions identified by their established track records in student success programs, Delta and JFF promoted the addition of activity-based costing measures to assessments of these programs. The hope was that this methodology could be the basis for evaluations of cost-effectiveness, including the payoff in increased retention and degree attainment. Although all of the programs had been evaluated, most of the evaluations were qualitative and not quantitative and rarely were translated into metrics such as reductions in units attempted or increases in graduation rates. Forcing the addition of costs into the assessment of effectiveness by necessity narrowed the focus of what “counts” for effectiveness to a relatively small number of dimensions that could be translated into measures of resources: courses attempted versus courses completed, number of credits obtained, proportion of students retained from one semester to the next, and degree completion. This did not mean that the

*Unlike most ROI studies—which compare costs of degree production to the earnings of college graduates or to societal benefits from higher education—internal ROI studies look at spending per student in relation to improvements in student retention.*



other reported types of success—such as increases in student self-esteem or even higher grades in course work—were not also important; they just were not measures that could readily be translated into measures of cost-effectiveness. This narrowing of the measure of student success was not welcomed uniformly by participants, some of whom reported concern that measuring costs would trump more nuanced measuring of student success. This pilot effort also found that the average cost for the programs studied ranged widely, as would be expected for a diverse set of programs and institutions, from as little as \$60 per student to \$1,600 per student—in all cases, just a fraction of average spending per student at these institutions. Because none of the participating institutions collected data on spending in other areas, however, the key question of comparative cost-effectiveness could not be answered.

### Work on Learning Productivity

A final and quite promising area of work has been in the area of what Bruce Johnstone calls “learning productivity”—or ways to increase learning with either less time or less costly inputs. Johnstone has argued that the cost pressures facing higher education require a fresh approach to improving learning, by focusing less on cost cutting—something he believed (in 1993) had run its course—to improving educational throughput at reduced time or cost per student. The examples of learning productivity Johnstone and others have called for include

- Improving retention and degree attainment by reducing “excess” credits to the degree through better counseling and more prescribed curricula;
- Increasing opportunities to accumulate credits through credit by examination, early-college high schools, year-round operations, distance-based learning, and study abroad;
- Reducing time to the degree, thereby reducing student costs for tuition and fees; and
- Reducing the need for remedial education, leading to increased course work required before students can begin to accumulate credit for college-level work.

A good example of modeling cost-effectiveness and learning gains that might be possible through one form of “learning productivity” comes from Carol Twigg (1999) and her colleagues at the National Center for Academic Transformation (NCAT), whose work on course redesign began with research to test whether technologically delivered course work could be a cost-effective substitute for some of the large enrollment courses common in the first two years at most institutions. Learning and costs were assessed for courses delivered through a traditional lecture/discussion session format and were compared to those of courses delivered through distance-supplemented learning. The primary cost difference between the two forms of delivery came from less time spent in course and materials preparation and from labor savings by substituting low-cost “coaches” for faculty and teaching assistants. The researchers found superior results at reduced costs for the technology-enhanced courses. Twigg’s research is one of a very few examples of work that incorporates cost assessment into the assessment of learning goals and outcomes. She and others who have worked with the NCAT model for course redesign report that the requirement to look at costs is one of the most difficult—and ultimately, one of the most rewarding—aspects of the assessment process. Faculty in particular are reported to experience great frustration with the activity-based costing models that force the assignment of costs to activities that require them to distinguish between scholarship, teaching, research and service in a way that

*A final and quite promising area of work has been in the area of what Bruce Johnstone calls “learning productivity”—or ways to increase learning with either less time or less costly inputs.*

they resist, since they often see them as part of a seamless whole. Still, they reportedly find that the incorporation of costs into other assessments elevate the clarity and usefulness of the ultimate results.

The revenue meltdown of 2008 and 2009 has meant that “learning productivity” efforts are expanding rapidly, through the efforts of several state systems and other college leaders. In the University of Maryland system, a comprehensive initiative to tackle inefficiency and to increase effectiveness included limitations on reimbursements for credits earned above 120 units required for the degree (with exceptions for higher credit requirements from specialized accreditation) and a requirement that all students earn at least one semester’s worth of credits through some form of off-campus instruction: credit by examination, study abroad, or distance-based courses. Another example can be found in the University of Wisconsin system. They initiated a system-level effort to reduce “excess credit” accumulation, through early intrusive advising and greater attention to course scheduling and sequencing. After just two years, they reported an average reduction of credits and time-to-degree of about a semester per student.

One challenge to the efforts to promote concepts of learning productivity relates to the metrics of cost measurement and the absence of a standard methodology for calculating degree production costs or for measuring savings from increases in learning productivity. To address this challenge, the Delta Cost Project commissioned a University of Florida researcher, Nate Johnson, to recommend a methodology for calculating costs per degree that could be used to set baselines for measuring productivity (Johnson, 2009). Using unit cost data from the public database, Johnson looked at average direct instructional costs to produce a baccalaureate degree for students who both started and completed their degrees somewhere in the University of Florida system. He produced three approaches to do this: the “catalogue” cost, the “transcript” cost, and the fully attributed cost—the “catalogue” cost being the bare minimum of courses required for a degree; the “transcript” cost including the actual cost for credits (and any “excess” credits beyond the minimum required for the degree) taken by students who graduate from the institution within six years; and the full cost attribution including the costs of credits accumulated by both graduates and students who did not complete any degree within eight years of enrollment. Using these three approaches, Johnson found a good deal of variation among average cost by discipline—some disciplines (for instance the hard sciences and engineering) having higher average unit costs per course taken and others (such as communications) having higher average credits accumulated beyond the minimum required, as they seemed to be popular “second-choice” majors for students who began in business or engineering but switched majors after one or two years. On average, for students in the Florida system, he found the following production cost for the BA degree:

*One challenge to the efforts to promote concepts of learning productivity relates to the metrics of cost measurement and the absence of a standard methodology for calculating degree production costs or for measuring savings from increases in learning productivity.*

Average catalogue cost across all disciplines for 120 credit units	\$26,485
Transcript cost of credits actually taken by graduating students, averaged across all disciplines	\$33,672
Full cost attribution, including credits taken by nongraduates	\$40,645

Using this metric, “excess” credits add an average of 27% to the cost to produce a BA degree, and attrition another 21%. The relatively low cost of attrition—21%—was a somewhat surprising result to some, since the Florida public universities average less than a 60% cohort graduation rate. The difference however is explained because the majority of attrition occurs in the first year of college, when average unit costs per student are lowest. While no one would argue that the catalogue cost of degree production should be the goal—e.g., to reduce excess credits to 0 or to eliminate all student attrition—this methodology nonetheless could be the basis for adding cost analysis to institutional efforts to increase retention and improve degree production.

## Reconnecting the Threads

Although more research is sorely needed, threads of what might be called an emerging consensus can be pulled from the research by generalizing from what is known and what might reasonably be surmised in the different works and by tracing the connections they have found between resources and different measures of learning and degree attainment. Restatements of the key findings follow.

- **Intentionality matters as much as or more than money alone.** Leadership matters, and institutions that have leaders that put resources behind instruction and student services show greater rates of persistence and graduation per dollar spent. The natural order in higher education is to let revenue availability determine spending priorities, rather than the other way around. But not all money is green. Much of the new money coming into higher education is targeted for spending on research or auxiliary enterprises and can't be spent on the core functions of instruction and student services. If the national priority is to increase academic attainment, more can and should be done to focus institutional and policy leadership on student learning and degree attainment as the first priority for resource use—rather than leaving these issues at the bottom of the academic pecking order.
- **Focusing resources on instruction and student services helps to increase learning, retention, and degree attainment.** Investments in faculty resources make a difference in student learning; student services investments are especially important for increasing retention among institutions serving large proportions of at-risk students. In a time of cost reductions and rollbacks in support to institutions, the pattern among public institutions across the country has been to disproportionately reduce funding in instruction and student services. To reverse this trend, deliberate efforts must be made to protect funding for instruction and student services. By promoting more transparent assessments of how institutions spend money, state policy makers can help with this agenda, but the primary locale for these efforts is the institutions themselves.
- **Student financial aid programs need to be restructured to support the goal of student degree attainment as well as access.** Student aid makes the biggest difference in low-income access but less of a difference in success. Grant aid allowing students to attend college full time and increasing funding for on-campus work programs can help improve retention and graduation.
- **Excess units and student attrition cost money and do not help students get to the finish line.** Curriculum realignment, aggressive academic counseling, and attention to course scheduling can all help

### Four key findings:

1. *Intentionality matters as much as or more than money alone.*
2. *Focusing resources on instruction and student services helps to increase learning, retention, and degree attainment.*
3. *Student financial aid programs need to be restructured to support the goal of student degree attainment as well as access.*
4. *Excess units and student attrition cost money and do not help students get to the finish line.*

increase student success at reduced cost, both to the student and to the institution. Redesigning curriculum to ensure coherence and to focus on learning results can be cost-effective if done with an eye on spending as well as on student success and if accompanied by attention to student and academic support services aligned with the goal of increased learning success.

## Concluding Thoughts

For a topic arguably so important, the existing body of work is embarrassingly thin. Using what we know and what we need to know as a point of departure, three areas emerge as priorities for future work.

- 1) Much more systematic work should be done on the use of faculty and student service resources and different measures of learning outcomes, including progress to degree for at-risk learners as well as robust learning results. This will require some massaging of data to create a good comparative sample of both staff inputs and learning outputs that can be compared over time and between different types of institutions. This work will not be inexpensive, but its cost could be reduced by pulling together data from existing state systems (in Florida, Illinois, New York, and Ohio, for example) that have course files and student unit record data.
- 2) Institutions and policy makers should promote greater transparency in cost reporting methods that focus on the ways institutions spend money. Without excessive detail, cost accounting can show broad patterns in where money comes from, where it goes, and what it buys. The Delta Cost Project has demonstrated that this can be done with existing data reporting through the federal IPEDS system. Institutions as well as states are, of course, free to supplement this aggregate data with more granular assessments.
- 3) Analysis of costs should be systematically embedded in the ongoing evaluation of students, whether of their learning outcomes or of their engagement behaviors. Adding cost analysis to ongoing assessments of student success will sharpen the focus and improve the usefulness of assessments. Student learning assessments have become too focused on compliance and do not yield results that are particularly helpful in making decisions about resources. Far too much cost analysis activity produces accounting information that has nothing to do with the use of the institution's resources. The institution's ongoing assessments, such as the institutional self-assessment within accreditation review as well as regular program reviews, could easily accommodate the addition of cost analysis. Activity-based cost calculators, such as those used by Delta, Noel-Levitz, and Twigg, are readily available and not that difficult to apply. Investments in training in assessment and in adding cost analysis to other dimensions of work would be required, however, since the language of cost analysis and metrics can be challenging to fathom. The addition of cost analysis will help demystify how institutions use resources and equip a new generation of leaders to think productively about how money gets spent. This is a far cry from enlightenment, to be sure, but lifting some of the ground fog is a good place to start.

*For a topic arguably so important, the existing body of work is embarrassingly thin.*



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## NILOA MISSION

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NILOA's primary objective is to discover and disseminate ways that academic programs and institutions can productively use assessment data internally to inform and strengthen undergraduate education, and externally to communicate with policy makers, families and other stakeholders.

## NILOA OCCASIONAL PAPER SERIES

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NILOA Occasional Papers are commissioned to examine contemporary issues that will inform the academic community of the current state-of-the-art of assessing learning outcomes in American higher education. The authors are asked to write for a general audience in order to provide comprehensive, accurate information about how institutions and other organizations can become more proficient at assessing and reporting student learning outcomes for the purposes of improving student learning and responsibly fulfilling expectations for transparency and accountability to policy makers and other external audiences.

Comments and questions about this paper should be sent to [sprovez2@illinois.edu](mailto:sprovez2@illinois.edu).

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## ABOUT NILOA

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- The National Institute for Learning Outcomes Assessment (NILOA) was established in December 2008.
- NILOA is co-located at the University of Illinois and Indiana University.
- The NILOA web site went live on February 11, 2009.  
[www.learningoutcomesassessment.org](http://www.learningoutcomesassessment.org)
- The NILOA research team reviewed 725 institution web sites for learning outcomes assessment transparency from March 2009 to August 2009.
- One of the co-principal NILOA investigators, George Kuh, founded the National Survey for Student Engagement (NSSE).
- The other co-principal investigator for NILOA, Stanley Ikenberry, was president of the University of Illinois from 1979 to 1995 and of the American Council of Education from 1996 to 2001. He is currently serving as Interim President of the University of Illinois.
- Peter Ewell joined NILOA as a senior scholar in November 2009.

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