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Report No. 177

Retargeting Higher Education Access and Persistence Efforts: Illustrating a 'System' Focused Process for Improving Public Policy

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July 1999

CQPI
University of Wisconsin

Report No. 177

Report Series
in Quality and Productivity

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ABSTRACT

Finding effective ways of increasing college access and persistence requires that proposed solutions be evaluated by how they individually and collectively interact with the broad goals of higher education. Only then is it possible to estimate the overall impact of any particular solution. This paper illustrates a "systems" approach, based on the quality function deployment model, to examine both the direct and interaction effects of multiple solutions aimed at improving access and persistence. The results of applying this approach on an illustrative basis suggest that quality and access policies must be pursued that support the entire educational system's capacity to improve. Rather than only more student aid, the "high leverage" solutions that emerge argue for improving the academic achievement of K-12 students and enhancing the quality of the K-12 schools. The paper concludes by outlining how researchers and stakeholder groups can jointly use an approach similar to the one we have illustrated to broaden consensus on how to improve important policies affecting issues such as access and persistence.

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INTRODUCTION

How to make college more accessible to a wide range of students and how to ensure that they persist in their studies and subsequently graduate continues to be a hotly debated issue. For a quarter century, the major policy initiative to improve access and persistence provided students with funds to attend college through the federal Pell grant program. Despite increased funding for Pell grants, as well as other student loan funds, neither access nor persistence have substantially improved. This outcome results, in considerable part, because of weaknesses in the deliberative processes that are used to improve higher education programs.

These weaknesses were illustrated at a November 1997 College Board conference celebrating the Pell grant's 25th anniversary (Gladieux, Astor, and Swail, 1998b). Beyond reviewing the history of the Pell grant program, the conference brought together the nation's higher education policy community to consider what programs most needed additional funding. Conference participants offered many proposals for improving access and persistence. However, these proposals were treated as competing ideas rather than as elements of a mutually reinforcing effort to improve higher education access and persistence. Thus, lacking a clear focus on the problems of the system, little was learned about how to resolve them.

Here we use a new matrix-based approach to analyze information obtained from the conference presentations and discussion, as well as the research literature, in order to envision how to improve the nation's education system and particularly how to enhance higher education access and persistence. This approach is designed to illuminate interactions among multiple higher education objectives and policy solutions, and thus help to identify current policy options with the greatest potential for improving the system as a whole. Our approach to analysis is a systematic and straightforward process that sharpens our thinking about causes and effects, and helps us develop testable theories that point to what can be called "high

leverage" or powerful solutions. With appropriate participation and careful verification using data-based research, this systems approach can be an innovative tool for analyzing a wide range of questions and issues where complex relationships exist among the key variables of interest.

THE ISSUES

The Pell Grant conference coordinator opened the gathering by stating: "Our purpose is to celebrate as well as reflect on the results, to review what was intended and what has been achieved, to examine how policies have shifted over the past 25 years and what directions they should take in the next 25." (Gladieux, 1998a, Gladieux, Astor, and Swail, 1998b). Meeting on Capitol Hill, the conference brought together congressional veterans, including former senator Claiborne Pell who played a key role in creating and sustaining the Pell grant program. Several recipients of Pell grants participated, offering personal statements describing how Pell grants affected their academic aspirations and achievements. Also attending were policy analysts who study student aid programs, as well as key advocates for student financial aid from congressional staffs and Washington's higher education associations.

The conference convened against a backdrop of rising concerns about the loss of Pell grant purchasing power; growing dominance of loans as a form of student financial aid, especially among low income students; shifts in state resources from need-based to merit-based aid; growth of private prepaid college investment plans for middle-income students; and newly enacted federal tuition tax benefits.

These first four developments are not new — they have been underway for more than a decade, some for much longer. The recently enacted "Hope Scholarship" tuition tax benefits, however, represent a new and unexpected development. When fully operational, the dollar magnitude of these credits is expected to increase the total amount of current federal investment in financial aid by 20 percent. However, most experts believe these tax credits will accrue principally to middle- and upper-income families whose children would attend college anyway. The direction of this change calls into question the future viability of need-based aid and the central role of Pell grants in providing such aid. More ominous, passage of this major addition to student aid funding suggests public disenchantment with need-based aid as a means of equalizing access to higher education.

The push for federal student aid began in the early 1960s and gathered force through the late 1960s and early 1970s. By 1973 a full-scale program of federal student aid existed, providing need-based grants, loans, and work-study employment. According to Gladieux (1998a), the Pell grant program was "intended to be the foundation of the entire student aid program—and the cornerstone of federal policy to equalize college opportunities." During the quarter-century since its inception, the Pell Grant program channeled more than $100 billion in need-based grants to more than 30 million college students. Recipients of these grants have been lavish in their praise of the program. Building on this record, but also in the context of approving tuition tax benefits, the Congress increased by $300 the maximum Pell grant. As a result, Pell funding increased by approximately $1.2 billion, to reach a total of $7.3 billion in FY 1998. Even then, Pell funding was dwarfed by total student aid funding from all sources, which, based on data for 1996-97, reached almost $56 billion (College Board, 1998). This total includes loans, grants, and work study funds provided by government, colleges and universities, and other sources.

Despite these seemingly impressive numbers, enthusiasm for student aid in Congress and state legislatures has diminished since the early 1980s, and inflation-adjusted levels of Pell grant benefits have eroded. The mixed assessments of student aid's impact on access and persistence have played some part in dampening that enthusiasm. These assessments range from one study showing major effects (Manski & Wise, 1983) of the kind predicted by Hartman (1972), to most studies which show at best modest effects (McPherson & Schapiro, 1991; Kane, 1995), and one study (Hansen, 1983) indicating no effects whatsoever. Moreover, sustaining stable levels of investment in student aid has proved to be considerably more difficult than anticipated (Mumper, 1996; Gladieux & Hauptman, 1995; McPherson & Schapiro, 1998). In the face of these difficulties, conference sponsors and many conference participants still viewed additional federal investment in Pell grants and other need-based student aid programs as the policy alternative most likely to improve access and persistence.

In the conference discussion other policy options were identified that could improve postsecondary access and persistence: improving other types of student financial aid, and providing early intervention (e.g., give extra help and encouragement to K-12 students so that more young people will be academically prepared for college). Some attention was given to coordinating Pell grants and tuition tax credits. Glancing reference was made to improving K-12 education. Surprisingly, no attention was given

to improving the quality of postsecondary institutions or trying to provide student learning at reasonable cost. Nor was much attention given to the economic returns to college degrees and the net cost of obtaining these degrees.

This paper has two purposes: the first purpose is to illustrate a new process for identifying the best available policy options for improving quality and access in higher education. The second is to use this process to explain the reasoning behind our evaluation of alternative proposals for improving access and persistence. We begin by creating a matrix composed of the core objectives for higher education and the policy alternatives identified in the research literature and mentioned by conference participants. Next, based on our knowledge of the literature and three decades of involvement in access and persistence research, we show how to estimate the strength of the relationships between each objective and each policy alternative. We, of course, realize that others might arrive at different estimates and consequently support different policy options than those that emerge from this process. We conclude our analysis by describing how more complete and reliable numerical assessments can be collected and analyzed. Doing so requires involving in the estimation process researchers and representatives of groups affected by existing access and persistence policies (hereafter referred to as stakeholders). Through this systems-focused approach, results can be produced that have greater likelihood of increasing the effectiveness of higher education as a system than solution-focused efforts such as the Pell conference.

PROBLEMS WITH A SOLUTION-FOCUSED APPROACH

The narrow focus of the Pell conference proceedings prompted us to wonder how it could be assumed that any particular program, such as Pell grants, offered the best way to improve access and persistence. This question took on added importance inasmuch as little effort was made to identify the current needs of the education system as a whole. Additionally, the leverage for improvement offered by particular programs or sets of these programs, remained unclear.

What appeared to be absent was any identifiable conceptualization of the major array of forces determining how Pell grants and other forms of student aid affect access and persistence. This gap raised a key question: what forces, conditions, and behaviors, and interactions among them, determine the impact of Pell grants on access and persistence? Other researchers have already identified these forces and tried to indicate their relative importance. A key contribution comes from Tinto (1993, pp. 68-69):

> Financial impact is generally conditioned by the nature of student experiences on campus and the weighing of costs and benefits of attendance. Though financial aid does indeed alter the cost side of the equation, making college attendance as possible for low income students as it does for more well-to-do students, it has, with the possible exception of work-study, little impact on the benefits side of the equation. Nor does it appear to alter the skills students bring with them to the college setting. These, as noted earlier, also shape persistence. But of course the primary goal of financial aid is to remove finances as a cause of attrition. That it seems to do, at least in large measure.

In other words, money is in itself not sufficient to assure equal opportunity; being academically prepared to succeed in college and thereby able to benefit from college is also critically important. The "mainly Pell" approach suggested at the conference appeared to be too limited to take account of the interaction of student aid with other factors affecting access and persistence. Nor did it seem capable of revealing the interplay between student aid and the overall quality of the nation's higher education system.

Another missing ingredient was any attempt to specify the effect of Pell grants on the major objectives of the nation's higher education system. This motivated our attempt to identify these objectives and to estimate how the solutions proposed at the conference would affect these objectives. The final missing ingredient was any systematic consideration of how implementing the proposed solutions would overcome the problems pointed out so clearly during the course of the conference. Filling that gap requires determining how the proposed solutions could be disaggregated into more specific policies, and how implementing these specific policies could leverage progress toward the major objectives of higher education.

A 'SYSTEMS' APPROACH

The decision-making process exemplified by the Pell conference proved to be too narrowly focused. It prematurely omitted many questions and alternatives other than expanding Pell grants. It failed to acknowledge and harness the richness of ideas and expertise that was contained in the audience. It lacked a means to assess specific proposals and to identify those offering the greatest leverage for improving access and persistence within a systems context. To overcome these shortcomings, we use a new systems focused approach to identify a path for improvement that illuminates the contributions that Pell grants, need-based student aid, and other interventions can make now

and in the future. Viewing higher education access and persistence as the unit of analysis compels thinking within a systems context about how to improve both the overall quality and the financing of higher education, and at the same time strengthen K-12 education and its links to higher education.

The particular approach we adapt to policy analysis is called Quality Function Deployment (QFD). This approach, which is extensively described in the quality improvement literature (Akao 1990), is designed to help organizations develop products and services that meet important stakeholder needs. Awareness of such needs results from studying the mission-bounded needs of a given institution's intended beneficiaries. In social institutions like higher education, understanding of stakeholder needs emerges from interaction and debate among politicians, analysts, and affected citizens. Although this process often leaves much to be desired, over time important needs have been identified. In the process higher education access and attainment have been improved, in part because of considerable agreement among politicians and scholars about the major goals of higher education and public needs.

Working from lists of widely agreed upon goals and needs, our next task as users of a QFD derived approach is to reason through arrays of factors inherent in a complex system, such as education, in order to identify specific actions that will do more than other possible actions to help achieve the overall aims of the system. For example, if we want to compare the potential impacts of a "mainly Pell" solution with other solutions for improving access and persistence, the first step is to estimate the priority of each objective by assessing its relationship with each of the broad objectives of higher education. We do so using a scale from 1-10 with 10 being most important. After that we need to consider where we are now and where we need to be in order for current efforts to advance all the objectives that support improvements in student access and persistence. The next step involves cataloguing the list of proposed solutions and then estimating their effect on each of the broad objectives. Because of our interest in pointing out the "leveraging" possibilities of each solution on each broad objective, the individual effects of each solution are estimated using a 9-3-1-0 scale (0 = no connection, 1 = weak connection, 3 = moderate, 9 = strong connection) as recommended by Akao (1990, pp. 22). The importance of each solution is then determined by calculating its estimated impact on advancing each of the broad objectives. This process, which is more fully explained later in the paper, makes it possible to distinguish between what can be called "high" and "low" leverage solutions.

The next step calls for linking the highest leverage solutions to what we call implementable policies and then assessing these policies for their impact on those high leverage solutions. To facilitate the analysis, the implementable policies are divided into five categories: K-12 students, postsecondary students, student financial aid, K-12 institutions, and postsecondary institutions. Again, a 9-3-1-0 rating scale is used to estimate the relationship between each policy and each high leverage solution. The resulting values reveal which implementable policies are likely to have the greatest relative impact on the broad objectives of higher education, mediated, of course, by the earlier assessment of the proposed solutions on the broad objectives.

We caution readers that the weights assigned to objectives, broad solutions, and policies should not be interpreted literally, since they estimate general possibilities rather than exact certainties. This caution is essential because the results of this analysis rest heavily on the interpretations and judgments of the authors, which in turn are based on the assessment of recent research and their own research on access and persistence over the past three decades. However, one advantages of this approach is that other investigators who may disagree with the end result are presented with an opportunity to assign their own ratings and to trace the impact of their ratings on the final results. In short, the model we use here provides an opportunity for others to become involved in estimating the interaction effects of a wide array of policies on multiple objectives. Moreover, the explicitness of the analysis lends itself to close evaluation and indeed replication by others whose knowledge and judgment may differ and consequently reveal contradictory results. In other words, differences of interpretation can be pinpointed and perhaps even reconciled; or at least, the reasons for different interpretations can be made more apparent.

IDENTIFYING BROAD OBJECTIVES AND PRIORITIES

The first challenge is to identify the broad objectives of higher education that the many public programs, including the Pell grant program, seek to promote. The Pell grant's main objective, as already noted, is to increase access and persistence among young people from lower income families. Its larger purpose, however, is to ensure the development and maintenance of a well-educated labor force that can stimulate the nation's rate of economic growth, increase individual prosperity, and enhance the ability of people to deal with an evermore complex world (Bowen, 1977; Schultz, 1971). More recently, Barnett (1992), in highlighting the importance of improving the quality of

higher education, elaborates two sets of objectives: those benefitting society as a whole, and those that focus on student learning and development.

Our distillation of this literature yielded six broad objectives of higher education: (1) develop the workforce needed to facilitate the nation's economic growth and security, (2) increase the affordability of college in ways that promote access and persistence, (3) enlarge the number of high performing schools and colleges capable of meeting students' needs, (4) increase the learning and educational attainment of K-12 students, (5) improve the quantity and quality of student learning in college, and (6) help at-risk youth succeed academically. Though the new list reflects our particular views, we would expect considerable agreement on these objectives notwithstanding some differences about their precise phrasing.

Establishing the relative importance of higher education's major objectives is the first step. This calls for determining how well each of these objectives is being realized. Then, these objectives must be prioritized; this can be done by estimating the importance of making progress toward each of them within some reasonable time period, in this case over the next five years. This task must be completed before exploring the relationships between solutions and objectives because the priority rankings are essential in guiding the later assessment of the relative importance of the solutions.

Prioritizing higher education's major objectives is not easy. The conference papers and literature on higher education offer little guidance. Hence, we draw on our own research and reflection, combined with a general understanding that each major objective affects every other major objective and therefore is essential to higher education's overall success; i.e., those core objectives that are not substantially met will undermine the overall quality and effectiveness of higher education (Barnett, 1992).

Our particular aim is to identify objectives where improvements are most needed to increase the effectiveness of the total system. Table 1 is therefore structured to assign a lower priority to objectives that are being met relatively well and give a higher priority to those objectives whose performance is currently less satisfactory. In keeping with this view of the interrelatedness of those objectives, we assign in column A the same high ratings of importance to each of the six objectives, using the previously mentioned scale 1 to 10 scale. Our assessment of how well these goals are being realized varies widely, as indicated by the ratings in column B. The results show that the goals most closely and directly related to student aid (objective 2) are the best served, as indicated by their higher ratings. By contrast, preparing at-risk youth to succeed academically in college (objective 6) receives the lowest rating, meaning that the help provided members of this group is generally failing to prepare them for success in college.

Table 1. Broad Objectives and Needed Improvement

	A Importance	B Current Status	C 5 Year Goal	D Needed Improvement Rate (C/B)	E Objective Priority Values (DxA)	F Objective Priority Weight (%)
Broad Objectives						
1. Develop workforce needed to facilitate nation's economic growth and security	10	4	8	2.0	20	15
2. Increase affordability of college in ways that promote access and persistence	10	6	8	1.3	13	10
3. Enlarge number of high performing schools and colleges capable of meeting students' needs	10	4	8	2.0	20	15
4. Increase learning and educational attainment of K-12 students	10	3	8	2.7	27	20
5. Improve quantity and quality of student learning in college	10	5	8	1.6	16	12
6. Help at-risk youth succeed academically	10	2	8	4.0	40	29
Total					136	100

The next step calls for assessing how much improvement is critical to the success of higher education during the coming five years; these assessments are offered in column C. In the absence of other information or insights, we assumed a similar target level of eight for each objective, given the low likelihood of achieving greater gains within five years.

Based on these ratings, it becomes possible to estimate a needed rate of improvement (column C divided by column B). Because the objectives are equally ranked in importance, the resulting values (column D) depend entirely on our assessment of how well these objectives are being realized now relative to what we think might be possibly achieved within five years. The results in column D identify those solutions that, if implemented, are likely to exert the greatest possible leverage for improvement, namely, objectives 6 and 4, with their needed improvement rate of 4.0 and 2.7, respectively.

The final steps at this stage involve multiplying the value of the objective's importance (column A) by the objective's needed improvement rate (column D). The resulting objective priority weights (following Akao, 1990, p. 28), which are then rescaled to equal 100 percent (column F), indicate where the biggest potential payoffs are for realizing the major objectives of higher education and student access and persistence. What emerges most clearly is Objective 6, with its priority weight of 29, on the importance of helping at-risk youth to succeed academically in college. Close behind is the importance of increasing the learning and educational attainment of all students (objective 4) with its priority weight of 20.

Interestingly, and perhaps paradoxically, the smallest payoffs are for the Pell-related objective of increasing the affordability of college in ways that promote access and persistence (objective 2). This result does not imply that affordability is less important than the other objectives, or that efforts to make college more affordable should be neglected. Rather, the access-persistence objective does not now warrant as high a priority as some other objectives because the Pell program under present conditions is contributing about as much as it can to improve access. Major barriers existing elsewhere in the system must be overcome before Pell grants can exert a greater impact. More specifically, increasing the dollar value of Pell grants is unlikely to produce enrollment increases until greater numbers of low income high school graduates (e.g., Pell eligible students) are academically prepared to benefit from college attendance. If, however, efforts to increase learning throughout the K-12 system succeed, a time will arrive when student aid will once again provide substantial leverage in improving access and persistence. That outcome depends on greater proportions of high school graduates from lower-income families graduating from high school being better prepared academically to succeed in college. Meanwhile, efforts might be made to improve the targeting of need-based student aid, particularly Pell grants, as mechanisms for directing grant aid to students who otherwise would be unable to afford the costs of college attendance.

LINKING SOLUTIONS WITH MAJOR OBJECTIVES

What are the possible linkages between the solutions, many of them mentioned by the conferees, and the major objectives of higher education? These linkages are established with the help of a grid that shows the importance of each solution to the realization of each major objective. The grid lists the various solutions in the columns and the major objectives, along with the objective improvement weights, in the rows. Rather than using an interval scale, we adopted a 9-3-1-0 scale that yields a wider spread of ratings so that the solutions with the greatest leverage are more readily apparent (Akao 1990, pp. 22.).

The end-product of this exercise, shown in Table 2, is a solution priority weight for each proposed solution. The relative weight of a given solution is derived by adding the results of multiplying each solution relationship score (9-3-1-0) with each objective priority weight (last column). For example, the solution priority weight for the first proposed solution, "Make Pell a fully funded entitlement," is derived by multiplying each of the six relationship scores with the corresponding priority weights (A1*AD1+A2*AD2+A3*AD3+A4*AD4+A5*AD5+A6*AD6). When summed, these scores produce a solution priority weight of 94, which is then converted into a percentage to estimate its importance compared to other solutions. The solution importance values shown in the bottom line of Table 2 range from 13 down to 0. These values reflect our best estimate of the relative effects of each solution on each major objective. As noted earlier, these results are based on our synthesis of the research literature, conference presentations, and discussions with other Pell conference attendees.

The solutions with the greatest leverage on the broad objectives as a group, as the scores show, are to motivate at-risk students to succeed academically (13), improve the academic preparation of at-risk youth to succeed in college (11), ensure that low-income youth take college preparatory courses (9), expand institutional capacity to improve learning via staff development (8), increase in-

stitutional self-analysis directed toward improving learning (7), require institutional government collaboration to improve learning (6), and develop criteria for assessing institutional efforts to improve learning (6). Interestingly, the solutions most closely associated with financing display relatively little leverage. Thus, the analysis suggests that the key to increasing access and persistence is to increase the motivation of at-risk students to learn and to improve the capacity of schools to help students learn.

Is there any empirical support for these conclusions and, more specifically, for the ratings of the various solutions in contributing to the objectives of higher education? Consider first the "improve Pell" solutions. We begin with the "student aid only" approach reflected in column A (Table 2): make Pell a fully funded entitlement adequate to meet educational expenses. The principal effect of this solution would be on Objective 2: increase the affordability of college in ways that promote access and persistence. Yet, we would not rate this solution as having more than a moderately positive effect unless a higher percentage of Pell eligible students are academically well prepared to succeed in college. The consensus of research on access shows that increased student aid produces at best only small increases in enrollment (Hansen, 1983; McPherson & Schapiro, 1991; Kane 1995).

Research on persistence shows that the targeting and packaging of financial aid equalizes opportunities, but only for those students who are well-prepared academically (Stampen & Cabrera, 1988). Because the relationship between being well-prepared academically and being suc-

Table 2. Leveraging Effect of Proposed Solutions on Broad Objectives

Relationship Scores

0 = No Relationship
1 = Weak Relationship
3 = Moderate Relationship
9 = Strong Relationship

Proposed Solutions

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
	Improve Pell			Improve Student Financial Aid												Intervene Early						Improve Institutions								
Broad Objectives of Higher Education	Make Pell a fully funded entitlement	Provide institutional incentive aid to increase Pell recipient persistence	Front load Pell	Invest massively in need based student aid to maintain quality of work force	Make it easy for students and parents to calculate eligibility for aid	Let insts assess families finances and determine amounts of aid	Equitably integrate student financial aid and tuition tax credits	Retarget student grants and work study on low income students	Simplify and clarify eligibility for need-based student aid	Increase proportion of aid in the form of college work study	Increase the proportion of aid in the form of grants	Maintain the economic value of grants	Maintain the economic value of loans	Expand college savings plans	Motivate at-risk youth to succeed academically	Improve academic counseling support for at-risk youth in secondary school	Improve academic preparation of at-risk youth to succeed in college	Ensure that low income youth take college preparatory courses	Notify sixth-graders of aid if they finish high school	Help families plan futures before students reach high school	Inform at-risk students of college opportunities/admissions standards	Increase institutional self analysis of effectiveness	Expand institutional staff development to improve learning	Investigate the causes of recent increases in tuition	Use new technologies to increase learning at affordable cost	Increase state support for instruction	Encourage institutions to collaborate to improve learning	Require institution/government collaboration to improve learning	Develop standards for assessing institutional efforts to improve learning	**Objective Priority Weights**
1. Develop the workforce needed to facilitate the nation's economic growth and security	1	1	1	1	0	0	1	1	0	1	1	1	1	0	9	3	3	3	1	1	1	3	3	1	1	3	3	3	3	15
2. Increase affordability of college in ways that promote access and persistence	3	3	3	1	1	1	3	3	0	1	1	1	1	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1	0	10
3. Enlarge number of high performing schools and colleges capable of meeting students' needs	0	1	0	0	0	0	0	0	0	1	0	0	0	0	3	3	3	1	0	1	0	3	3	3	0	1	1	3	3	15
4. Increase learning and educational attainment of all students	1	1	0	0	0	0	0	0	0	0	0	0	1	0	3	3	9	9	3	3	1	3	9	1	0	3	1	3	3	20
5. Improve quantity and quality of student learning in college	0	3	0	0	0	0	0	0	0	1	0	0	0	0	9	1	1	9	1	0	0	9	3	3	0	1	0	3	3	12
6. Help at-risk youth succeed academically	1	1	1	0	0	0	0	1	0	3	1	0	0	0	9	3	9	3	3	3	1	3	3	1	0	3	0	3	3	29
Solution Priority Values = sum (solution ratings * objective priority weights)	94	145	74	25	10	10	45	74	0	139	54	25	45	10	619	249	543	435	184	187	64	355	393	145	25	219	90	283	273	
Solution Priority Weights (expressed as %)	2	3	2	1	0	0	1	2	0	3	1	1	1	0	13	5	11	9	4	4	1	7	8	3	1	5	2	6	6	

cessful in college is so strong, we could not give ratings of more than 1 to the effectiveness of more generous Pell funding in contributing to Objectives 1, 4, and 6. And, inasmuch as no strong connection exists between student learning and financial aid in the form of grants/loans, ratings of 0 had to be assigned to Objectives 3 and 5. The overall result is a relatively low solution weight for the "student aid only" approach (Solution A). The other two "improve Pell" approach (Solutions B and C) produce similar results.

What are the likely effects of the second category of solutions: "improving student financial aid?" Consider the effect of college work/study (CWS) programs in Column J: increase the proportion of aid in the form of CWS. A Markov analysis (Stampen and Cabrera 1986) found that CWS recipients (alone or in combination with other forms of aid) drop out of college less frequently than do recipients of grants and loans. A plausible explanation is that working on campus helps integrate students in healthy and productive ways into the social and academic life of the institution. This explanation is consistent with what prevailing theories of student success and persistence predict (Tinto, 1993; Cabrera, Casteneda, Nora, & Hengstler, 1992). Two factors restrict the effectiveness of CWS. One is the limited number of available campus jobs; the other is the low level of federal investment in the program (CWS constitutes no more than 5 percent of total federal student aid funds). Nonetheless, CWS rates a moderate 3 for its potential in serving Objective 6: help at-risk youth succeed in college. We assign a 1 to Objectives 1, 2, 3, and 5 because, although the CWS program is likely to remain small, it alone among student aid programs links student aid to institutions in ways that support improvements in learning. A 0 is assigned to Objective 4 because the program's effect is limited to its recipients. The other solutions for improving student financial aid exert similarly small effects, though the patterns differ slightly from solution to solution.

Another approach is through the third set of solutions: intervene early. Consider the importance solution O of trying to motivate at-risk students to succeed academically. Research shows that an important cause of poor academic performance is the lack of motivation, often associated with the alienation at-risk students feel in the K-12 grades (Fine, 1986; Fine, 1991). Research also shows that substantial gains in student learning can be achieved through early intervention (Fenske et al., 1997). Increased motivation and the increased learning that results can increase the percentages of at risk youth who succeed in the K-12 grades and may as a result become eligible for college. Evidence comes from the success of Eugene Lang-type programs that offer mentoring and generous financial help for college to successful at-risk students. Even though working with youth early in life will do little to affect the affordability of college and thereby promote access (rated a 1), the strong ratings of 9 seem to be appropriate to Objectives 1, 5, and 6. Success in this direction will increase the learning and educational attainment of all students and, simultaneously, increase the number of high performing schools and colleges. Therefore, ratings of 3 are given to the effects on Objectives 3 and 4. The effect on Objective 2, which concerns access and persistence, is given a rating of 1 because the five-year time horizon is too short to allow for an increased flow of academically prepared high school graduates. Over the longer run, however, more and more students should be motivated and academically prepared to attend and succeed in college.

If at the same time a complementary solution could be implemented, namely Solution R, which is to ensure that more low-income youth take college prep courses, then access and persistence will increase but not in the short run. In the longer run, however, this barrier can be expected to diminish as high school students take the appropriate numbers and mixes of core academic subjects. This solution would have strong effects on Objectives 4 and 5, moderate effects on Objectives 1 and 6, weaker effects on Objective 3 and no effect on Objective 2.

Taken together, these results reveal the limitations of a "student aid only" approach to higher education improvement unless other important characteristics of the system change simultaneously. By itself, increased student aid in general, and Pell grants in particular, will fail to support the other five major objectives. Moreover, a "student aid only" approach fails to recognize that the major objectives of higher education are interrelated and mutually reinforcing.

Many solutions shown in the columns of Table 2 are stated quite broadly and because of that may read more like objectives than solutions. For this reason, we developed a more detailed list of what we call "implementable policies." In addition to a few of the solutions from Table 2, this list elaborates many more-detailed policies that are implicit in the original list of proposed solutions. These more specific, implementable policies are grouped by their focus of improvement: K-12 students, postsecondary students, student financial aid, K-12 institutions, postsecondary institutions.

Our final challenge is to estimate the leverage of the implementable policies on the high-leverage solutions that, in turn, display the greatest potential for realizing the major objectives of postsecondary education. Essen-

tially, the same procedure is employed in arriving at these ratings. The results, shown in Table 3, are again based on the 9-3-1-0 rating; they yield policy importance weights (the right-hand column) that point to the specific solutions most worth implementing. Again as in Table 2, we look for the highest and lowest policy importance weight categories.

The high-leverage policies emerge because of what they do, or do not do, for access and persistence when viewed in the context of the broad objectives of postsecondary education rather than the narrow goals of the Pell program or all student aid programs as a group. The highest-leverage implementable policies can be identified in the bottom line which shows the policy importance weights. They are concentrated in K-12 institutional improvement category, closely followed by K-12 student improvement category, both of which focus on student learning. Next comes postsecondary institutional improvement and postsecondary student improvement; again, both focus on improving learning. At the bottom is student financial aid. In other words, the crucial barriers to increased persistence and financing are not rooted in the adequacy of finance as much as they are in overcoming the weakness in student learning and school effectiveness. These results also highlight the absence of any system, comparable to the student aid system already in place, for supporting greater and more fruitful collaboration between higher education and K-12 schools aimed at producing school improvement and increasing student learning.

Table 3. Leveraging Effect Of Implementable Policies on High Leverage Solutions

Policy Rating Scores

0 = No Relationship
1 = Weak Relationship
3 = Moderate Relationship
9 = Strong Relationship

Implementable Policies

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
	K-12 Student Policies					Postsecondary Student Policies				Postsecondary Financial Aid Policies								K-12 Institution Policies							Postsecondary Institution Policies					
High Leverage Solutions	Expand pre-school Headstart programs	Provide coaching and extra instruction for at-risk students in elementary school	Counsel at-risk students to take appropriate academic courses in high school	Provide coaching and extra instruction for at-risk students in high school	Improve vocational education programs for those not planning to attend college	Offer early assurances of student aid for academic achievers	Improve information about Postsecondary work, training, and education opportunities	Improve information and counseling about college choice and financial aid availability	Develop easier methods for calculating availability of financial aid	Simplify and clarify eligibility for need-based aid	Retarget grants and workstudy to low income students	Increase Pell funding	Make Pell grants an entitlement	Front load Pell Grants	Increase funding for work-study programs	Cap allowable limits on student borrowing	Coordinate federal need-based aid with newly enacted tuition tax benefits for college	Improve academic preparation of teachers and staff in K-12	Offer financial rewards for professional teacher certification	Train teachers and staff how to monitor and analyze student learning	Adopt national learning standards and testing for grades 4,8, and 12	Create national criteria for assessing institutional effectiveness in enhancing learning	Widen the dissemination of information about school effectiveness	Recognize effective schools	Set high academic standards for college admission	Train college faculty and staff how to monitor and analyze student learning	Facilitate inter-institutional cooperation to enhance instruction	Offer institutions supplementary funding to provide academic support for Pell recipients	Use new technologies to enhance instruction and learning	**Solution Priority Weights**
1. Motivate at-risk students to succeed academically	3	9	3	9	3	9	3	3	1	1	3	3	1	3	3	1	1	3	1	9	1	3	3	3	1	3	3	3	1	13
2. Improve academic preparation of at-risk youth to succeed in college	9	9	3	9	1	3	3	3	1	1	3	1	1	1	3	0	1	3	1	9	1	9	3	3	0	3	3	3	1	11
3. Ensure that low-income youth take college preparatory courses	1	9	9	9	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	3	1	0	0	0	0	9
4. Expand institutional staff development to improve learning	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	9	9	9	3	3	9	9	0	9	9	0	3	8
5. Increase institutional self analysis of effectiveness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	9	1	9	3	3	3	3	3	0	0	0	0	7
6. Create incentives for institutions to collaborate to improve learning	0	0	0	0	0	0	0	0	0	1	3	3	3	1	0	0	0	3	1	3	1	1	1	3	0	0	0	0	3	6
7. Require institutional and governmental collaboration to improve learning	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	3	1	1	3	3	0	0	3	0	1	6
Policy Importance Values = sum (policy rating * solution priority weights)	147	297	153	297	77	177	99	99	24	30	90	68	42	56	109	19	24	231	115	396	90	222	216	228	43	144	162	72	72	
Policy Importance Weights (expressed as %)	4	8	4	8	2	5	3	3	1	1	2	2	1	1	3	1	1	6	3	10	2	6	6	6	1	4	4	2	2	

At present, too low a priority is placed on developing schools that are effective at generating substantial increases in student learning, especially for less well-prepared, low-income and minority students. However, promising new approaches are evolving, such as the Department of Labor's SCANS criteria for assessing improvements in schooling and learning (Tribus, 1994). Also, initiatives such as the federal government's High Hopes program may help. This program aims to bring colleges, middle schools, businesses and community organizations together to give children in high poverty schools information on the benefits of college, academic requirements, and financial aid opportunities, as well as mentoring and tutoring needed to keep students on track toward college (Smith, 1998). These approaches, along with others, need to be tested through implementation and careful evaluation of their effectiveness.

If there is one message that emerges from this analysis, it is that more resources should be invested in improving K-16 collaboration aimed at motivating at-risk youth to succeed academically. However, such investments can yield substantial benefits only if participating institutions are committed to increasing their own effectiveness and operating with a reasonable degree of efficiency.

CONCLUDING OBSERVATIONS

This paper applies analytical tools that enable us to assess solutions to important policy problems that affect higher education as a system, with particular application to the impact of student financial aid on access and persistence. Though seemingly elaborate, the analysis offers a systematic process for linking broad goals, proposed solutions, and implementable policies in a way that identifies high leverage solutions and in turn high leverage policies. Thus, the approach employed here, where the system is the unit of analysis, can be a powerful tool for sorting through a wide range of questions, issues, and complex relationships. Moreover, it can produce a plausible and testable, and therefore useful, theory of future actions aimed at improving college access and persistence.

The paper's substantive conclusion is that student aid funding cannot at this time be regarded as the prime mechanism for improving access and persistence. This is not to say that funding levels are unimportant. Clearly, they are, as former Pell recipients argued so eloquently at the Pell conference. However, increased access and persistence cannot occur until substantially greater numbers of high school graduates are academically qualified to enroll in postsecondary education. Producing these graduates requires increasing the effectiveness of K-12 schools and raising the motivation of students to learn. Once the numbers of academically prepared high school graduates increase, student aid funding levels will assume substantially greater importance.

This analysis has significant implications for colleges and universities trying to increase access and persistence, especially for students from low income minority and nonminority backgrounds. These institutions must join with others in helping K-12 students, parents, schools, and communities find ways of enhancing learning in the K-12 grades. Until now, higher education institutions have not considered this a major part of their mission. Instead, they have watched from afar as K-12 schools in the major urban areas steadily declined in quality. They have given little more than lip service to the more than decade-long push for school reform. They have failed to mobilize their research capacities to help understand the plight of the public schools and their students. They have failed to provide leadership that might help energize the schools, their students, and their communities, and thus improve the quality of the K-12 enterprise.

Higher education institutions also have serious problems that are not unrelated to those in the K-12 schools. Colleges continue to admit unprepared students, knowing that substantial percentages of them, including many Pell grant recipients, will quickly drop out, discouraged about their inability to cope with the academic challenges of college. Interestingly, dropout rates in higher education make those in the worst K-12 school districts look impressive by comparison. In addition, considerable numbers of students graduate from college without having mastered the knowledge and skills they are taught or what they came to learn. Institutions often try to overcome these problems by adding a program here and another program there, but such programs never seem to produce more than marginal improvements in the academic performance of these students.

The challenge for higher education, if it hopes to increase access and persistence, is to recognize that K-12 and higher education comprise two major components of society's larger education, training, and employment system (Hansen, 1994; Fesco, 1995). That system involves K-12 education, postsecondary occupational training, community colleges programs, and four-year baccalaureate degrees programs, not to mention employer-provided training in the workplace. In principle, this system is dedicated to bringing students to their highest levels of achievement and thereby equipping them to seek satisfying employment and rich, fulfilling lives. The reality is that the system performs considerably less well, simply because the individual components of that system are not aligned as part of the larger education and training system.

To bring about change, higher education leaders must demonstrate the importance of this broader systems viewpoint. They must take leadership in helping to improve the performance of their own institutions. They must also help advance the learning and academic achievement of K-12 students who represent their most important market for future students. But, they cannot do this alone. Rather, they must lead in forming K-16 coalitions that seek to improve learning at all levels. Unless higher education assumes a more prominent role in the school improvement movement, it will be destined to continue failing to reach its ambitious targets for access and persistence, particularly for students from low income minority and nonminority backgrounds.

These strongly worded conclusions occurred to us as a result of carrying out this analysis. What we don't know is how many readers and other experts might agree with these conclusions. How might we obtain a broader consensus on how to improve higher education access and persistence? One useful approach would call for establishing two advisory panels, one representing groups that have important stakes in improving higher education access and persistence and another composed of higher education researchers. These two groups, assisted by expert analysts/facilitators, would be asked to fill in and work through the matrixes. Questions and problems confronted within and between these groups would be researched and reconciled until the participants had a clear understanding of current realities and were generally agreed on the most effective solutions. Such an approach, in addition to being an interesting experiment in forming policy judgments, would substantially raise the level of discourse about the perplexing issues affecting the success of college access and persistence policies.

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