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Understanding Productivity In Higher Education

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PREFACE

This is one of several papers prepared by RAND for the California Education Roundtable as part of a partnership designed to identify problems and limitations in California's existing postsecondary system as well as alternative responses to these problems. This white paper presents background information on the issue of productivity in higher education and develops a framework which could form a starting point for the development of a productivity improvement strategy for California higher education.

ABSTRACT

The State of California will face significant challenges over the next decade as it tries to tries to maintain access to higher education for all Californians who can benefit, in the face of limited state resources and pressure to allocate those limited resources to other purposes such as corrections. Productivity improvement is frequently looked to as a strategy which would enable the state higher education system to continue to meet public needs without an increase in public spending. The purpose of this paper is to present an overview of the literature on productivity in higher education and in the service sector more generally, and to provide a framework for thinking about productivity improvement for a state higher education system. This framework will serve as a useful starting point for a public discussion on a series of steps to assist state policymakers in developing productivity improvement programs for the higher education sector. The framework suggests that there are four key steps involved in productivity improvement: defining the unit of analysis, articulating the objectives of the higher education system, identifying measures of efficiency and effectiveness which relate to those goals, and developing strategies for improving and monitoring productivity.

We link this framework to the California context, illustrating the complexity of the issue through use of specific issues state policymakers might face as they begin to address this problem. The examples included are intended not as policy recommendations but rather as points of departure for policy discussion amongst members of the California Higher Education Round Table.

INTRODUCTION

The recent decline in public financial support for higher education (Benjamin and Carroll, 1995) is having a significant impact on the sector as a whole. Higher education institutions and systems which seek to meet increasing demands while maintaining the quality of education in a resource constrained environment are being forced to consider two basic strategies: 1) generate additional revenue; and 2) increase productivity. Many institutions have increased their revenue generating capacity through tuition increases, private fundraising campaigns, the establishment of "profit centers" such as professional MBA programs and the creation of partnerships with local businesses. However, the ability of universities to increase revenue in these ways is not limitless, as reflected by the negative public reaction to tuition increases which have outpaced inflation for over a decade (Research Associates, 1993). As a result, productivity improvement is increasingly looked to as a long-term response to the problem of constrained resources. The purpose of this research project is to develop an understanding of the concept of productivity as it relates to higher education and to begin to create a framework to aid policy makers at various levels in generating, evaluating, prioritizing and implementing productivity enhancing changes in the higher education sector.

Interest in productivity enhancement strategies for higher education in the state of California stem in part from the fear that the state will not be able to accommodate all students who would like to attend an institution of higher education unless the state and its citizens allocate additional resources to the sector and/or there is a dramatic reduction in operating costs per student (Shires, California Post Secondary Higher Education Commission). Concern about the state's ability to accommodate enrollment demand exists for a wide range of plausible state funding scenarios (Park and Lempert). Productivity improvement appears to be one important strategy for dealing with the problem. Independent of the merits of the approach, the concept of

productivity improvement has captured the attention of politicians and the public at large, perhaps in response to the observation that private sector companies have gone through a spate of restructuring activities and are learning to "do more with less" -- decreasing costs while increasing profits. In the interest of encouraging similar improvement in the higher education sector, the State of California challenged each of the three state higher education systems to find $10 million dollars in cost savings per year for four years beginning in 1995.[1]

One way to study productivity in higher education is to identify all potential cost saving strategies and estimate the total cost savings from engaging in these activities. However, this approach has two limitations. First, although many institutions of higher education around the country are engaging in activities purported to promote productivity improvement, there is very little documentation of actual cost savings. As a result, there is little to draw on in the way of "lessons learned" which could help the State of California predict which efforts might be most useful. Second and more importantly, productivity improvement is a lot more than cost cutting, and an ability to "do more with less" is the result not simply of budget cuts, but of a critical examination of goals and objectives, and the implementation of long term productivity initiatives based on those goals and objectives.

The goal of this paper is to provide a foundation for discussion and effort directed toward the development of comprehensive productivity improvement strategies that make sense given the goals and objectives of the state.

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[1]These *explicitly* mandated "productivity improvements" follow a series of efficiencies implicitly mandated by the budget cuts imposed on the California higher education systems between 1990 and 1994.

THE CURRENT PRODUCTIVITY DEBATE

Following a general trend toward applying private sector concepts and standards to public or quasi-public institutions, researchers, government officials and the popular press have identified productivity improvement as a way for higher education to deal with the problem of constrained resources. Productivity is also a fundamental, but often unarticulated element of the performance-based funding initiatives that are being used or considered in several states (Rupper, 1994). These programs use fundings a lever of control by awarding or withholding funds on the basis of a state institution's performance as measured against a set of pre-determined indicators. These, and other types of accountability mechanisms are intended to induce institutions of higher education to increase their productivity (Ashworth, 1995), under the assumption that public accountability on this dimension will create incentives for productivity improvement at individual institutions.

Unfortunately, no consistent definition of productivity has been employed in the course of these discussions. As a result, productivity improvement is a poorly understood concept in the higher education context, one that is often view by insiders with outright hostility. Most often, it is associated with quality insensitive cost cutting or attempts to increase the efficiency of the administrative apparatus within universities (Zemsky, Massy and Oedel, 1993; Heverly and Corensky, 1992). If there is to be serious discussion of productivity improvement in higher education, it will be necessary develop a common understanding of what the concept means and what it implies.

DEFINING PRODUCTIVITY

At its most basic level, productivity is a measure of output per unit of input (Griliches, 1987). This is a technical but general definition which can be applied in a variety of different contexts. From the public's perspective, productivity of higher education can be thought of as how much individuals and society are getting from the education sector, given the resources they put in. Productivity also reflects

whether the system is "wasteful" in some sense. The issue of productivity in higher education has become all the more important as the sector has grown and post secondary education becomes the norm rather than the exception for most Americans. Unfortunately, defining and measuring productivity in the education sector has proven to be a difficult task. These problems are often cited as reasons to ignore the issue productivity in higher education. However, many of the problems mentioned are also faced in other service industries and organizations in these sectors have made progress toward developing workable definitions and measures of productivity.

The concept of productivity has two dimensions: efficiency and effectiveness. *Efficiency* refers to the level and quality of service which is obtained from the given amount of resources (Epstein, 1992). If the sector can produce a greater quantity and/or higher quality of output with the same amount of resources, it has improved its efficiency. *Effectiveness* relates to the extent to which the provider meets the needs and demands of stakeholders or customers. In the higher education sector, these stakeholders include students, faculty, local communities, state governments, industry, and the nation-at-large. Using this broader definition of productivity, it becomes clear that productivity improvement is not synonymous with "cost-cutting." Instead, productivity improvement is a multi-faceted concept, inextricably linked with the goals and missions of the institution or system under consideration.

MEASURING PRODUCTIVITY

In order to put this theoretical definition of productivity into practice, it is necessary to come up with some measures of productivity. Several features of the higher education sector create difficulties for productivity measurement. The most obvious is higher education's status as a type of service industry. The problems associated with productivity measurement in service industries have been well documented (Sherwood, 1994; Dean and Kunze, 1992). These problems include identifying the basic output unit (is it the service transaction or outcome?), determining the value added, isolating the "customer's" contribution to the outcome (as

this should not be included in a productivity measure), and accounting for the many aspects of quality.

Each of these problems is salient to the higher education sector, and the problems are often used as excuses for not measuring productivity. It is important to note, however, that most of these same problems plague attempts to measure the productivity of government services. While there is no specific formula for addressing all the concerns, the literature on productivity measurement in the public sector does suggest some general guidelines that might be useful for higher education.[2]

The general approach is to develop measures of both efficiency and effectiveness, and then to use these measures together in order to monitor productivity improvement. Ideally, the measurement of output and inputs can lead to standard output/input ratios. These can take the form of either *technical efficiency ratios,* which measure physical output per unit input, or *economic efficiency ratios* which compare outcomes to inputs in a more general way (Hatry and Fisk). In many cases, however, problems in measuring either input or output do not allow for the creation of these neat input/output measures. In these cases, it is necessary to rely on indirect measures, in which the amount of resources used by the organization is presented along with outcome and service quality data.[3] The standard technique used in defining output is to focus only on those outputs that are used outside of the organization or organizational sub-unit under consideration (Forte, Bureau of Labor Statistics).

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[2]Indeed, it was long believed that it was not possible to measure the productivity of government services (Forte), and no attempt was made to do so. This changed in the early *1970s* with the development of the Federal Productivity Measurement System. State and local governments soon followed the federal lead, and productivity measurement in the public sector became more common

[3]In cases where the organization being studied produces multiple outputs, the outputs are often weighted according to some criterion and then summed. The Federal Productivity Measurement system weights activities according to the employee years involved in producing that output in some base year. It is also possible to use a variety of other criteria such as the amount of capital inputs or the value of the output and an organization must devise a weighting formula that reflects its needs and priorities.

Effectiveness is often more difficult than efficiency for organizations to measure. Epstein (1992) enumerates four basic strategies used in the public sector to help accomplish this task:

The first is to measure *community or client conditions.* These can either be positive conditions that the client would like to maintain or improve (such as the proportion of graduates who are employed within six months of graduation), or adverse conditions that the client would like to minimize (such as the number of sexual harassment complaints on campus). These measures can be compared to standards or benchmarks determined by either the organization's historical experience or the conditions that exist in other institutions of higher education. Such benchmarks can highlight areas in which an institution is doing well relative to its peer group, and those areas where the institution should focus its effort to improve performance.[4]

Another common way to measure effectiveness is to examine service *accomplishment.* Service accomplishment measures tend to capture what the organization is actually doing because service accomplishments are less likely than community and client conditions to be influenced by exogenous forces such as economic conditions, demographic trends or natural disasters. These measures are most useful when they include quantity as well as quality elements. Service accomplishment measures often take the form of number of clients served in a specified and meaningful way. Such a measure in the higher education sector might be the number of graduates (as opposed to total FTEs) or the percentage of undergraduates who take a class that requires them to write a research paper requiring library research.

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[4] Coopers & Lybrand and NACUBO prepared a benchmarking study for the California State University System. The study focused on institutional performance in the following administrative areas: accounts payable, admissions, central budget department, facilities, financial aid, general accounting, human resources, payroll, procurement, registration and student accounts receivable. This study developed four basic types of benchmarks (workload, efficiency, effectiveness and cost) and compared figures for CSU with those of a set of public comprehensive universities. These measured community and client conditions as well as service accomplishment discussed below. See Coopers & Lybrand and NACUBO (1994)

For some outputs, it is difficult to measure effectiveness directly. In these cases, it is worthwhile to measure *client satisfaction and perceptions.* This can be done by monitoring complaints or by conducting focus groups, interviews or surveys. In the higher education context, an institution might conduct surveys of alumni satisfaction with their education, or survey the local business community on satisfaction with the universities role in economic development.

The final approach is to measure the *unintended adverse impacts* of a service on the community. This strategy recognizes that the impact of a service cannot always be neatly controlled by the provider, and that even the best laid plans can have unintended, adverse effects. In the higher education context, a possible example of adverse consequences might be a decrease in student learning or retention associated with large increases in class size.

DEMONSTRATING PRODUCTIVITY IMPROVEMENT

In most cases, it is necessary to use all four types of effectiveness measures in order to present a complete picture of an organization's productivity. While any particular productivity initiative will address a specific set of objectives, it is also possible to demonstrate overall productivity improvement associated with several initiatives taken together. From a practical standpoint, Epstein suggests four basic ways to combine efficiency and effectiveness measures in order to demonstrate productivity improvement:

1. Demonstrate a measurable increase in revenue due to special efforts without increasing taxes or fees.
2. Demonstrate a measurable improvement in one or more key efficiency indicators while maintaining or improving key measures of effectiveness.
3. Demonstrate a measurable improvement of one or more key effectiveness indicators without increasing costs or specific resources, or while increasing costs by a percentage less than the measured percentage improvement in effectiveness.

4. Demonstrate a measurable reduction in cost while maintaining or improving key measures of effectiveness.

The particular method chosen will depend on the objective of the productivity initiative in question. The key is that a successful productivity initiative should satisfy at least one of these criteria. It is worth noting that an initiative that simply reduces the costs of an organization does not necessarily improve productivity. In order to be a productivity improvement, an initiative must reduce costs while maintaining or improving key measures of effectiveness.

The literature on productivity in public organizations generates some useful guidelines for thinking about productivity in the higher education context. However, the step from these general guidelines to an implementable framework for productivity improvement is a large one.

One clear task involved in making the leap between the theory and implementation is the identification of "key" effectiveness and efficiency indicators. Someone must take the initiative in defining and prioritizing the objectives of the organization, and in developing the measures used to evaluate progress toward those goals. Failure to properly identify the key effectiveness measures leads to a great deal of confusion and contention. At one extreme, a failure to specify *any* key measures leaves an institution with no ability to gauge how successful a particular productivity initiative has been. A different problem is a failure to articulate a complete list of key effectiveness measures. This can lead to a situation where an initiative clearly harms an important aspect of the organization's service output, yet the initiative is deemed successful since it has improved productivity as measured by the selected but incomplete set of effectiveness and efficiency indicators. The most obvious example is a mandated reduction in costs that is unconcerned with the impact on quality. Finally, a failure to articulate and prioritize the key performance measures in a complete manner opens an institution to attack on many fronts, as groups can easily come up with alternate indicators of effectiveness to argue that effectiveness was reduced. Such inevitable tradeoffs among worthy objectives are better dealt with explicitly, not only to address

legitimate group interests, but to ensure that whatever initiatives are undertaken have a better chance of being successfully implemented and meeting the objectives of the policymakers. The next section of this paper addresses how this general framework for evaluating productivity initiatives can be applied in the higher education context.

DEVELOPING AND EVALUATING PRODUCTIVITY INITIATIVES IN HIGHER EDUCATION

The discussion in the previous section suggests that the process of improving productivity in higher education involves at least four basic steps. The first is to define the unit of analysis (e.g., the academic department, the university, the multi-campus system). Productivity improvement can occur in many different ways and at many different levels of the organization, and its nature will differ significantly according to that level. The second step is to articulate the objectives of the relevant unit of analysis in a consistent way. It is impossible to discuss productivity improvement without knowing what outcomes are to be improved, what these specific improvement goals are and the relative importance of these goals. The third step is to devise measures of efficiency and effectiveness in areas related to the goals. The final step is to link the goals with the identified measures in developing a strategy for improving and monitoring productivity.

Failure to complete each of these steps can lead to serious problems. How can institutions of higher education demonstrate or improve productivity if they don't know what they are being evaluated on? This lack of a definition often leads institutions or state governing bodies to adopt *ad hoc* measures of productivity based on information that happens to be available, rather than information that would actually reflect something about the efficiency and effectiveness with which institutions are generating outputs and outcomes (examples of such measures can be found in Schapiro, 1993; Gilmore and To, 1992; and Massy, 1994). For example, an institution may place a high priority on the productivity of instructional activities within the institution: the quality and quantity of "education" the institution can generate with a given set of resources. If it is easy to measure average time to degree in years, then that may be used as a measure of an institution's teaching productivity, even though that number reflects nothing about the quality of the education received, the difference between the number of courses required and the number of courses taken, and thus captures only a certain aspect of productivity. The tenuous relationship between

commonly used productivity measures and true outcomes of interest leaves productivity initiatives wide open to attack on the grounds that they are not capturing "relevant outcomes." One of the major reasons why productivity is such a misunderstood topic in the higher education context is because these connections between measures and outcomes have not been taken seriously.

STEP 1: DEFINING THE UNIT OF ANALYSIS

The first task is to define the unit of analysis. For example, an analysis of productivity in higher education could focus on the productivity of an individual (a professor), an organizational sub-unit (an academic department or a school within a university), an organization (a college or university), or a population of organizations (a state higher education system or the higher education industry as a whole). The specific productivity goals and the key indicators selected will differ depending on which level of analysis is the focus.

While there are many levels at which productivity can be analyzed, in this paper we focus on efforts to improve the productivity of the state higher education system[5] as a first attempt toward addressing the question of how productivity improvement can help ameliorate the fiscal problems facing California higher education. In doing so, we are not asserting that other productivity concerns at other levels of analysis are uninteresting or unimportant -- quite the contrary. The state system determines the context for productivity initiatives at other levels of the higher education system and in some cases, productivity improvement at the department or institution level may be part of a state-wide productivity improvement effort. Moreover, the definition of productivity at the institutional level will be specific to the Institution, based on the conglomeration of stakeholders a particular institution serves and possibly different from the definition most relevant from a state-wide perspective. An examination of state-wide

[5]By "state higher education system", we mean the entire set of institutions of higher education. In California, the state higher education system is comprised of three distinct public sub-systems and a set of private institutions.

attempts to improve productivity thus highlights rather than masks the potential conflicts across the different levels of analysis.

STEP 2: DEFINING THE OBJECTIVES

The preceding discussion stressed the importance of defining objectives before considering specific productivity initiatives. This step must also precede the development of appropriate efficiency and effectiveness measures because it determines what the "numerator" in the output-per-unit-input ratio should be. Defining a set of objectives is also key to evaluating *overall* productivity because it allows for the prioritization of multiple efficiency and effectiveness objectives, and highlights the inevitable tradeoffs that must be faced. A crucial element of this task is to define exactly *what* the system or institution produces, and how valuable that is to society. In defining objectives at this initial stage, the state, while recognizing that different institutions will contribute in different ways to each of the goals and objectives, should not attempt to specify the mission of individual institutions at this stage, or consider what other stakeholders such as the federal government, want from higher education. Individual institutions will take these other demands into consideration in defining institution-level goals and objectives. The task at hand is for the state to clearly articulate what the state higher education goals are.

Once these state-level goals have been articulated, individual institutions can then take these and other factors into account in determining their own institution-level objectives. The institutional goal-setting process is complicated because it must reconcile the state government's goals with those of other stakeholders of the higher education system in general, and of the individual institutions. In community colleges, for example, the state government is a significant stakeholder. However, these institutions also must consider the demands of their particular student body, faculty and the local community. At public research universities, there are additional stakeholders such as the federal government, private corporations, and active alumni. Each of

these stakeholders has different priorities and the priorities of the institution will be an amalgam of these.

The articulation of goals is something which must occur through public dialog with broad participation. However, to provide a starting point for such a dialog it is useful to examine the goals that have been articulated by other states, often in the context of state-wide performance based funding initiatives that are sweeping across the nation. In a summary of state performance based funding initiatives, Ruppert identifies five general categories into which the goals articulated through such programs fall: educational quality and effectiveness; access/diversity/equity; efficiency; contribution to state needs; and connection and contribution to other education sectors in the state (Ruppert, 1995, pp. 18-19). Table 1 (see Appendix A) lists examples of each type of goal, as found in one or more states with state-wide performance indicator systems. A review of these indicators reveals that While some can be considered outcome goals, others are actually *process* or *input* objectives, which are believed to be associated with desired outcomes. One common example of a process objective is to increase the number of tenure track faculty teaching lower-division students. Clearly, this is considered a goal because it is assumed that teaching by tenure track faculty contributes to the quality of undergraduate education. The real outcome goal, however, is to improve or maintain the quality of undergraduate education.

Process and input goals are attractive to policymakers because it is often easier to devise measures of progress toward these intermediate goals than it is to measure progress toward outcome goals. The literature on productivity measurement in service industries acknowledges this reality, but stresses that it is important for policy makers to refrain from using such process objectives as ultimate goals unless they can clearly demonstrate a direct link between the outcome and the process. This is crucial because in identifying a process goal rather than the underlying outcome goal, the state may be precluding alternative ways of achieving the desired outcome.

STEP 3: DEVISING MEASURES OF EFFICIENCY AND EFFECTIVENESS

After the goals and objectives of the state have been determined, efficiency and effectiveness measures can be devised. The measures selected must be able to capture progress toward the specified goals. It is crucial to avoid selecting measures *before* defining goals because this can easily lead policymakers to value what is measurable rather than measure what is valuable. Indeed, there will be instances where it is impossible to come up with a perfect measure of achievement of a particular goal. In such cases, it may be worthwhile to use a less-than-perfect measure of the basic goal rather than a perfect measure of something different from the true goal. This is a particularly important issue to consider when financial incentives are to be linked to these measures. Providing incentives for outcomes or processes that are not clearly aligned with the ultimate goals can have negative consequences, particularly when they are combined with incentives that other stakeholders are providing to the institution.

The process of selecting measures on the basis of the goals forces the decision makers to recognize the strength and weaknesses of the measures and structure policy accordingly. For example, it is quite common for universities to measure the fraction of undergraduate courses taught by tenured faculty. Focusing on this available measure, decision makers could claim to be measuring quality of undergraduate teaching. However, this only captures *one* dimension of the quality of teaching, and hence does not in and of itself measure teaching quality. In order measure quality, a school might also want to consider the size of courses, teacher evaluations, pass rates on licensure exams, and other factors.

Another important reason to clearly distinguish between *goals* and *measures* is that a single measure might bear a relationship to several goals. For example, average class size might be a measure of teaching efficiency (where a higher number is "better") and teaching quality (where a lower number might be better). Depending on the relative importance of teaching quality vs. teaching effectiveness in the overall goals, a change in average class size will have different implications.

A review of the literature indicates many different potential indicators of efficiency and effectiveness -- often referred to as

"productivity measures" (see, Schapiro, 1993; Gilmore and To, 1992; Massy, 1994). As is the case with goals and objectives, the performance indicators currently used in the higher education context can often be classified according to whether they are input, process or output/outcome measures. Bottrill and Borden compiled a list of more specific measures used by institutions of higher education across the country. We have listed a selection of these measures in Table 1.1, linking them to the commonly articulated state-wide goals.

Recognizing that the commonly used measures fail to account for important elements of what the institution is producing and fail to isolate customer (student) input from the service provider (college or university) input, many institutions are undertaking major projects in order to gather information for more sophisticated measures of output. These alternative measures address these issues by examining things such as the percentage of seniors who go on for advanced degrees, the percentage of freshmen who graduate, and outgoing student test scores.[6]

Such efforts are providing decisionmakers with extremely useful information that relates to the goals and objectives and can be incorporated into the process of monitoring productivity initiatives. In many cases, the development of these alternative measures is costly. However, an ability to measure the true objectives can translate into an ability to to improve performance in a real sense. If the objective is important enough and cannot be measured in any other way, it may very well be be worth the cost involved to develop the alternative measures.

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[6]Florida and Wisconsin offer "Rising Junior" exams which test basic writing and math skills at the end of two years of higher education. Alverno College in Wisconsin has developed an elaborate testing scheme for assessing student *progress* in a variety of areas. Northeast Missouri State administers the ACT COMP test to sophomores and compares the results with pre-matriculation results to assess the learning that occurred during the first two years of the undergraduate program. (McClain, 1986). Because the goals and objectives of community colleges are varied and the success of the institution can only be evaluated by comparing the intentions and preparation of the student with individual outcomes, student surveys can be particularly powerful measurement tools for these types of institutions. The British Columbia Student Outcomes survey, which began over ten years ago, is an example of an intensive student survey effort.

STEP 4: DEVELOPING A STRATEGY FOR IMPROVING AND MONITORING PRODUCTIVITY

Efficiency and effectiveness measures can be used in conjunction with the goals and objectives of the institution to develop productivity initiatives. A productivity initiative is not simply a list of goals and objectives, but a strategy for improving productivity as defined by these goals, and a *mechanism* for monitoring that improvement.

Since productivity fever hit the higher education sector, most productivity initiatives have taken the form of performance-based funding initiatives or budget reduction/ cost-cutting drives. Performance-based funding initiatives generally link some proportion of state funding to institutions' success in meeting state-defined performance goals. However, many researchers assert that the programs have not been successful in generating the desired improvements. ((Ruppert, 1995), Gaither (1995)) One of the problems with these systems stems from a failure to carefully consider goals and objectives and select appropriate performance measures. A second problem stems from the lack of incentives used to encourage productivity improvement within the institution -- the proportion of institutional budgets "at stake" under these programs is normally small. The other major type of initiative (if they can even be called productivity initiatives) that we observe are budget-cutting or cost-cutting programs which have focused on cutting administrative costs and reducing overhead budgets.

There are good reasons why institutions of higher education have chosen to approach "productivity improvement" in this way: It is easier -- both politically and technically -- to make sacrifices in areas which are not "core activities" of the enterprise. Rather than cut programs which might impact an integral output of the institution, efficiency initiatives have focused on administrative services, which are viewed as ancillary to the core activities. However, systems and institutions must begin to critically examine the limitations of this strategy. An analysis of the budgets of organizations of higher education suggest that productivity improvements must extend beyond the administrative arena if higher education systems are to meet their goals. In the 1992-93 academic year, administrative expenditures represented only 13.1% of total educational and general expenditures of public universities in the

United States. For public four-year and two-year colleges, the figures were 19% and 20.9% respectively. Combined expenditures for administration, student services and operation and maintenance of plant amounted to 24% of total expenditures for public universities, 34.8% for public four-year colleges and 41.4% for two-year public colleges. The remaining costs are expended on the "core" activities of institutions: instruction, research and service. (National Center for Education Statistics, 1995). Thus, by focusing productivity improvement efforts on administrative activities, colleges and universities are restricting potential productivity gains.

Lessons from the private sector also suggest that it is well-planned reorganization and not simply a focus on cost-cutting that generates the most significant and long-lasting productivity improvement. Blaxill and Hout (1991) argue that: "overhead is not only about cost; more fundamentally, it's about process. . . Companies that pursue change by focusing on cutting costs are only asking for trouble." An organization can't expect to improve productivity and competitiveness in the long run simply by cutting administrative costs. Blaxill and Hout argue that an organization must focus on its core activities and restructure the production process to improve outcomes. This involves careful consideration of what comprises the "core" activities. Porter echoes this notion, stressing that firms improve productivity by improving operational efficiency and by improving the value the buyer derives from the products and services the firm generates. Cost-cutting is thus only one dimension of productivity improvement. The other is what Porter calls "strategic positioning" or choosing the set of activities to perform and performing them well.

Similarly in the higher education sector, states must seriously think about what activities or services it values most highly and the most effective way for the system to perform those activities. While it is beyond the scope of this paper to suggest specific strategies for productivity improvement in higher education, we believe that the literature on corporate restructuring and productivity improvement can provide a starting point for structuring thought and generating possible strategies. Ultimately, higher education leaders will have to pose

alternatives, which will subsequently be considered in view of political, economic organizational realities. The following discussion can provide a point of departure for this larger process.

It is useful to recognize that productivity improvement can be generated in one of two generic ways: either by inducing changes at lower levels of the organization through the creation of mandates or incentives, or by restructuring the organization itself. Restructuring is a general term which describes a wide range of actions or activities. For example, in a corporation, restructuring might include changing the division structure (e.g., from a geographic to a functional basis), altering the chain of command (e.g., by getting rid of some levels of the organizational hierarchy), changing the scope of responsibility of divisions (shifting responsibility for a product line from one division to another) or closing/spinning off divisions. Parallel changes in the higher education system might involve changing the structure of public sub-systems so that they are organized on the basis of geography (e.g. the LA - area system) rather than function; streamlining the management of the public systems; changing the scope of activities of particular sub-systems, for example by removing from the function of research universities the first two years of undergraduate education; or by merging two systems such as the UC with the Community College system.

Productivity improvement at the state level might also be generated by encouraging productivity improvement at the sub-system, institution, department or individual level. Again, there are countless strategies of this sort, but there are really only two basic means through which a state can encourage productivity improvement at lower levels of the system: through explicit mandates (which rely on a the legal power to compel) or through structuring incentives (normally financial) for institutions to meet state-wide goals. When considering productivity improvement through delegation, it will be important for the state to note that sub-units of the higher education system (e.g. subsystems, institutions, and departments) have their own priorities and objectives. While the state goes through this exercise of developing productivity improvement strategies, it is also occurring in individual institutions, in departments, etc. The nested nature of this process, illustrated in

Figure 1 (see Appendix B), will thus add to the complexity of the issue as productivity initiatives at one level of the system may conflict with or confound those initiated at other levels.

In trying to induce productivity improvement at other levels, states must determine the appropriate balance between incentives and mandates. Although mandates are more likely to evoke a specific response, incentives are attractive because they allow the individuals or groups with the most information and expertise the flexibility to make decisions taking that information into account. In a corporate setting, it is difficult to imagine shareholders trying to develop productivity targets for workers (e.g., a worker must produce ten widgets per hour) or sub-units and direct the CEO to meet those, because they know that lower level managers have information about production processes and environmental conditions that executive level managers do not have. But this is precisely what is occurring in some state higher education systems around the country as state governments develop specific "productivity" targets and compel university presidents to meet them, or mandate that specific departments and programs across the system be cut.

For example, in 1993 the Ohio legislature approved a measure mandating a 10% increase in teaching loads in public colleges and universities- The following year, they established specific standards for different departments in different institutions based on their role in the higher education system. For example, in departments granting only associate deqrees, 80 to 90 percent of aggregate faculty time must be spent teaching. Meanwhile, for doctoral degree department, the requirement is 50 to 60 percent (Cage)[7]. In all likelihood, the state and society do not actuality care whether faculty spend 10% more of their time teaching than

[7]Hines and Hingham show that state mandates on faculty workload have become increasingly common. In 1995, 23 states required institutions to report faculty workload data publicly and ten states had substantive mandates regarding classroom teaching loads, faculty contact hours or tenure evaluation criteria. In addition to Ohio, the most aggressive states are West Virginia and Washington. Washington has mandated a 10 percent increase in the number of undergraduate degrees per full-time instructional faculty by 1998 and West Virginia has mandated that faculty productivity exceed average faculty productivity in similar institutions by 10 percent.

they do now. They *do* care that undergraduates receive a quality educational experience at a reasonable cost; they also care, but perhaps to a lesser extent, about the research and service output of the faculty. They have a sense that faculty are spending "too much" time doing research and "not enough" time engaged in teaching. Since some policy makers view institutions' attempts to address state priorities as ineffective, they instead choose to create specific policies that either mandate or link funding to specific inputs, processes or outcomes based on some observable variable that is easy for stakeholders to monitor and control.

This dangerous tendency on the part of some stakeholders to "micro-manage, institutions of higher education leads to a situation where high-level policymakers such as state legislators or state higher education boards are developing productivity targets that dictate to all levels of the organization, rather than delegating that responsibility to lower level managers. While such programs may seem attractive, policymakers must bear in mind the fact that it is the individuals closest to the "production processes" who have the greatest amount of information about how to improve those processes. From a state perspective, it may appear that mandates are the most effective means for the state to get institutions or individuals to do what it wants. However, states must realize that legislators and state-level bureaucrats may not even consider the most promising options. As a result, by mandating specific sorts of behavior, the state is constraining institutions and individuals and may be stifling organic productivity innovations.

THE CALIFORNIA CONTEXT

The California higher education system will face serious challenges meeting the goals of the Master Plan in the current budgetary environment. As in many other states, government leaders are demanding that the higher education system operate more efficiently -- that it do more with less. This suggests that the primary mechanism for monitoring productivity improvement will be Epstein's definition #4, discussed above: Is the system reducing costs while maintaining or improving the key performance indicators? The current strategy employed by the state is to direct each public higher education system (UC, CSU and Community Colleges) to demonstrate $10 million in cost savings (note that they call this productivity improvement, but it is in fact, cost saving) each year for the next four years. These mandates came to the systems with no other guidance -- no priorities or objectives to consider. Moreover, the mandated $10 million per year in "cost savings" compares with annual expenditures of over $13 billion by public institutions of higher education in California, and over $5 billion in state funding for higher ecducation. Such savings will not allow the state to live up to the obligations set forth in the Master Plan. This paper advocates a more comprehensive approach to achieving productivity improvement as a means to address the higher education challenges in California:

1. *State the goals and objectives of the California Higher Education System,*

In stating the goals and objectives, it is necessary to consider the potential tradeoffs that will need to be made. As a starting point, Table 1.1 contains goals that have been articulated by other state higher education systems. These goals may be used as a starting point for brainstorming and discussion. We strongly suggest, however, that the goal articulation go beyond the general goals listed in this table. Cost savings, clearly, will be an important objective for California. Realistic budget projections, or a set of potential scenarios should precede an attempt to articulate goals and objectives to determine how

serious the need for cost savings is. Access is another goal that is commonly articulated in the state of California. However access is a very general, almost theoretical concept. The state must grapple with the details of this concept. Access for whom (all citizens, all "qualified" citizens, all citizens who could benefit)? Access to what (public, private, four-year, two-year)? Access at what cost to the individual? If sacrifices have to be made on some dimensions of access, what is to be sacrificed first? Quality is another oft-stated goal of the higher education system, but again it is a vague and elusive one. What precisely are the quality elements that the state would like to encourage? Is face-to-face contact with faculty a crucial element of quality? Is personal development important? Is it important that students meet some pre-determined intellectual standard, or is it sufficient if they simply improve from where they began? The failure to identify these elements precisely leaves almost any productivity initiative open to attack on the grounds that it hurts "quality." Again, if sacrifices have to be made on some dimensions of quality, what is to be sacrificed first? To what extent is quality more or less important than access or cost? What are the "key" performance indicators.[8]

Once the key objectives have been stated, they must be prioritized and linked. Ideally, the state would provide the highest quality education to all citizens at no cost to the individual, but that is simply not feasible. The question is, where are the sacrifices to be made? For example, the state may want to provide all citizens with access to some basic level of post secondary education which also contributes to a student's personal development at a cost which is affordable to the individual (be s/he rich or poor). The state may also want to provide adults with access to education that allows them to "retool" when they are switching careers. The state may have an interest in providing (but perhaps not subsidizing) a high quality education with intense personal interaction with faculty to the intellectual elite. We are not in a

[8]UC System administrators also note that once access has been defined, it is necessary to consider how it will be provided: through fully-subsidized public institutions, partially-subsidized public institutions, by nurturing non-subsidized private sector institutions?

position to articulate the state's goals or prioritize those. We must point out, however, that such an articulation is a necessary precondition to productivity improvement of the state higher education system.

2. Develop some effectiveness and efficiency indicators that reflect performance related to the aforementioned goals and objectives.

While it may be possible to choose measures from the list in Table 1.1, below, it may also be necessary to devise some new ones to meet state-specific goals. In some cases, it may be necessary to begin collecting new types of data, and conducting new surveys. However, consideration of measures should not begin until the goals and objectives have been articulated in order to avoid the trap of selecting objectives based on what is easy to measure.

3. Develop strategies for improving and monitoring the productivity of the system.

In an environment of constrained resources, this task will certainly involve a prioritization or weighting of different goals and objectives. On the basis of this prioritization, the system can develop productivity initiatives. A productivity initiative is more than the statement of a set of goals, it is a plan to foster the achievement of those goals. It is an "action plan" designed to allow the system to get from here to there.

We provide the following example to illustrate the difference between goals and concrete productivity initiatives and to emphasize the choices that must be made by the state when it is developing productivity initiatives. "Improving access" may be a general goal of the state, but it is not a productivity initiative. Improving the articulation of the system in order to provide more students with access to a four-year degree is a description of a potential productivity initiative but only a description. An initiative must also include a mechanism for achieving the goal. For example, in order to encourage as many students as possible to complete their first two years at a community college the state might decline to pay for the first two years of undergraduate training at a UC or CSU; provide funds to improve the transfer process, or to promote curriculum redesign within community colleges to facilitate transfer. There are clearly many other options available to the state. As this

example illustrates, the development of productivity initiatives will not be a trivial task.

GUIDELINES FOR DEVELOPING PRODUCTIVITY IMPROVEMENT STRATEGIES

This paper suggests that the process of developing productivity improvement initiatives is a tall task, which must be preceded by serious consideration of goals and of available measures for monitoring productivity improvement. While we are not in a position to propose any particular productivity initiatives for the state of California, we hope to initiate discussion of several major issue amongst policymakers in the state higher education community. In particular, we believe that the policymakers will be confronted with at least three major tasks as they attempt to generate productivity improvements.

RE-THINK THE STRUCTURE OF THE STATE HIGHER EDUCATION SYSTEM

In considering the issue of productivity from the state's perspective, it is important to recognize that not all systems and institutions of higher education will contribute equally to each objective. Indeed, part of the state and system leaders' responsibility is to determine what is the most efficient way to allocate responsibilities for different state goals across systems and individual institutions and to re-think the relationship among different units of the system. The division of labor associated with private industry provides an appropriate analogy: An auto company, for example, does not have all activities involved in building a car occurring at one factory. Instead, it is often the case that engines are built at one facility, gears and axles are built at another, and assembly occurs at yet another. The production structure balances the benefits of economies of scale and the costs derived from lost synergy from having different elements of the production process separated. A corporation might also decide to change the relationship between these different units in fundamental ways, by allowing divisions to buy and sell components from outside firms, by structuring

transactions between divisions in a more market-oriented manner, by electing to outsource certain production activities entirely or by engaging in joint ventures with other firms.

Similarly in the higher education context, the state should consider what is an effective division of labor among institutions. Are there efficiencies to be gained by concentrating some activities in specific institutions? If so, what is the best way to achieve such concentration? For example, it may be the case that it is inefficient for UC and CSU institutions to produce remedial education as the community colleges are much more effective in that endeavor. In such a situation, the state may have an interest in discouraging direct production of remedial education by the UC and CSU campuses. This could be accomplished in a variety of ways: by mandating that they not do it, by encouraging the UC and CSU campuses to contract with the community colleges (or private providers) for remedial education, or even by developing a separate state entity that focuses on the provision of remedial education.

A second major restructuring issue is outsourcing. There are two dimensions to this issue. The first is the extent to state colleges and universities should contract out specific functions or activities. While such outsourcing normally emphasizes things such as janitorial services or financial services, an institution could also outsource education-related functions such as remedial education. The second dimension is the extent to which the state should rely on the private sector in addition to the public sector to meet its objectives. The Cal Grant system currently provides residents with a small amount of funding to be used at private institutions -- such a program is an example of state reliance on the private sector to provide undergraduate education to citizens.

Another restructuring issue is whether existing bureaucratic structures (or lack thereof) are meeting state needs, and if not what the alternative to current structures are. To a large extent, restructuring at the state system level is inhibited by the lack of a state higher education "CEO" -- a person with the responsibility for performance of the sector and the authority to invoke such changes. Whereas corporate headquarters can tell a division to stop producing a certain product and

focus on another, a state cannot easily tell a college or university to close a certain department. If it is determined that major restructuring is needed, policymakers will have to grapple with the issue of how the restructuring is to be induced in the absence of an entity with authority over the system as a whole.

INDUCE PRODUCTIVITY IMPROVEMENT AT LOWER LEVELS OF THE ORGANIZATION.

As mentioned above, the state can induce productivity improvements at lower levels of the system though the use of mandates or incentives. The costs and benefits of mandates have been addressed in previous sections. The state performance indicator systems discussed earlier are one example of an incentive-based program for productivity improvement. The basic philosophy behind such programs is that the amount of money the state gives to institutions of higher education should depend on the extent to which those institutions meet the goals and objectives of the state. Thus, in theory, these systems use financial incentives to encourage institutions to undertake actions which improve productivity broadly defined. However, as stressed in this paper, such programs can only improve productivity if the objectives and the measures related to them are well-defined. There are numerous other ways the state can use incentives to encourage certain types of behavior within institutions.

A more hands-off approach to providing incentives to institutions is witnessed in experiments with alternative institutional management structures. Responsibility Center Management (RCM), which is currently being explored by UCLA, and has been implemented in some form by the University of Southern California, Indiana University, Southwest Missouri State and University of Pennsylvania among others, can be viewed as a strategy for encouraging productivity improvement by creating the financial incentives for it at the department or school level and sweeping away a lot of the existing rules and regulations. By placing "every tub on its own bottom," RCM allows individual units to benefit to a large extent from whatever cost saving or revenue generating initiative they implement. In so doing, an institution creates an environment ripe for a specific type of productivity improvement -- revenue generation and cost cutting.

CRITICALLY EXAMINE THE POLICY CONTEXT OF HIGHER EDUCATION IN CALIFORNIA

The state should review existing state rules, regulations, laws and policies governing the funding and activities of public and private institutions of higher education. It doing so, it should clearly articulate the purpose of such rules and regulations and consider the types of behavior that are encouraged or deterred by them. Ultimately, the state should work toward the elimination of needless or counter productive rules. This is crucial if the state wishes to encourage productivity improvement at other levels of the higher education system.

The need for more state-wide policy reform, even when the responsibility for productivity improvement is delegated to lower levels of the system, is driven home by University of California System analyses (Geiser, Gordon and Guerra, 1994) of various options for improving the capacity of the UC System. One of the issues analyzed was that of improving capacity by making better use of physical plant through summer and off-peak course offerings. The report concluded that this strategy would have only a marginal impact on capacity, unless summer attendance were mandatory. In that case, capacity might increase by as much as 20%, but it would likely have an adverse effect on the quality of education. However, one of the major barriers to the implementation of this strategy from the point of view of the University of California was the fact, that UC receives no state funding for summer quarter instruction. The point is that the state, through its funding policies, effectiveiy discourages a potential strategy for increasing capacity. This is merely one example of the linkages between institution-level efforts to improve productivity and state higher education policy.

CONCLUSION

Productivity improvement is a much more complicated endeavor in the higher education sector than it is in the private manufacturing sector where output is easily measured and objectives well defined. However, higher education can learn much from private service industries, which must grapple with the problems of defining and measuring the relevant output or outcome. It can also learn something from public sector organizations which have been working to develop appropriate concepts of productivity in cases where the profitability objective is not primary. Having reviewed the literature in these areas as well as that on "productivity" in higher education, we developed a series of steps which are crucial to productivity improvement in the higher education sector. These steps are not substantive policy recommendations, but a general. action plan. This plan requires a good deal of effort from state policymakers. The first step is to define the unit of analysis. The second is to define the objectives, recognizing that the key decision makers at different levels of the system may have different objectives. The third key task is to identify measures of efficiency and effectiveness base on the articulated goals and objectives. While in some cases, it will be possible to use existing performance measures, or at least existing data sources to create new measures, in some cases it may be necessary to begin a new data collection effort to develop the appropriate measures. The final step in the productivity improvement process is to develop strategies for improving and monitoring productivity which are based on the goals and objectives defined in task two. There are two basic types of strategies: restructuring or inducing productivity improvement at lower levels of the system, either through explicit mandates or through the use of incentives. Regardless of the strategy employed, it is important to recognize the impact that state rules and regulations have on institution-level attempts to improve productivity. It is crucial to critically examine all exiting policies, rather than layering new requirements and policies on what currently exists.

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APPENDIX A

The Table below was constructed after reviewing the higher education literature in two areas: 1) state-wide goals and objectives for higher education; and 2) performance indicators in higher education systems and/or institutions. Table 1 combines the information from these two literatures in order to illustrate several key issues discussed in the paper. First, it is notable that the literature reviewed did not link performance indicators with specific objectives. This highlights one of the major flaws of productivity improvement efforts undertaken throughout the country. Second, it is important to realize that many of the objectives and indicators listed in the Table can be applied at multiple levels of analysis. When reviewing the chart, it is helpful to consider how such measures might be more or less appropriate, depending on whether the "unit of analysis" is an academic department, school, university or state. Third, in compiling this chart, numerous "performance indicators" were not included because they were actually measures of strategy accomplishment rather than goal accomplishment (e.g., "stipend levels for graduate students" may be part of a strategy to accomplish the goal of "improved retention of graduate students"). Finally, we would like to note that since the information In this Table was drawn from several sources, a one-to-one correspondence between objectives and measures is not intended. The purpose of this Table, rather, is to illustrate the range of goal-setting and performance measurement that is ongoing in state higher education systems around the country, and to suggest the importance and difficulty of identifying appropriate measures and linking them to each objective.

The Table is divided into five sections, corresponding to the five major objectives of state-wide higher education systems, as defined by the research of Ruppert (ed.), 1994. While this is not an exhaustive set of categories, it provides a useful starting point:

I. Educational Quality

II. Access/Diversity/Equity

III. Efficiency

IV. Contribution to State Needs

V. Connection and Contribution to Other Education Sectors in the State

Within each of these five sections in the Table, there is a separate sub-section for "Outcome Objectives and Measures" and "Process or Input Objectives and Measures." The key sources for the data in the Table are Botrill and Borden, 1994 and Ruppert (ed.), 1994; additional information came from a variety of references, which are also listed in the bibliography.

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

I. EDUCATIONAL QUALITY

Outcome Objectives and Measures

Objectives	Measures
Improve general education mastery	• Scores of sophomores on ACT COMP exam • Scores on senior exit exam • Scores on SAT when taken after college education • Number of attained skills identified as course or program objectives
Increase student satisfaction with educational experience	• Satisfaction levels of graduates • Goal achievement reported by students
Improve writing and math skills of students	• Scores on senior writing exam
Maintain or improve national/state ranking of undergrad, grad and prof students in licensure exams	• Passing rate of graduates in licensure exams, by discipline or field • Number and percent of eligible programs accredited or reaffirmed

Process or Input Objectives and Measures

Objectives	Measures
Improve the quality of teaching	• Percent of students reporting not being significantly challenged by class material and assignments • Student satisfaction with instruction, programs, services • Percent of students reporting that they generally receive graded assignments back from instructors within one week • Average turnaround time for submission of final course grades
Improve student services	• Number, duration, degree of participation in recreational activities for students • Scope of services provided (compared to peers) • Students' satisfaction with academic and student support services • Graduates' satisfaction with academic and student support services

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

I. EDUCATIONAL QUALITY (cont.)

Process or Input Objectives and Measures

Objectives	Measures
Increase faculty involvement in undergraduate instruction	• Percent of classes taught by full-time faculty • Number of independent study sessions offered per student • Percent of students reporting after-class conversations with faculty • Percent of students reporting having visited faculty during offices hours • Percent of faculty reporting involvement with a student club or organization • Percent of senior faculty teaching undergraduate classes • Percent of students reporting that instructor held review sessions in addition to class time • Average number of graded assignments or exercises given per course
Maintain or increase investment in instruction related activities	• Amount of time, means, and results of institutionalized activities toward educational innovation • Percent of faculty reporting use of individualized or alternative forms of instruction • Number of volumes or books per student in the library
Improve the quality of academic advising	• Student satisfaction with academic advising • Graduate satisfaction with academic advising
Enhance access to advising	• Average faculty or staff advising load • Average number of hours per week spent advising students • Number of students per advisor • Number of student contact hours with advisor
Improve access to small, seminar-style classes	• Probability that a student will be enrolled in two or more classes with fifteen or fewer students • Average number and distribution of classes of fifteen or fewer students experienced by a student in his or her undergraduate career • Percent of faculty reporting knowing the majority of students in their classes by name • Student/faculty ratio • Graduate student/faculty ratio

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

I. EDUCATIONAL QUALITY (cont.)

Process or Input Objectives and Measures

Objectives	Measures
Provide active learning environments which promote lifelong learning skills	• Percent of students reporting that they were encouraged to ask questions in class when they did not understand something • Percent of faculty reporting giving students credit for active class participation • Percent of students reporting participation in group study • Percent of students reporting out-of-class discussions with fellow students • Percent of faculty reporting efforts to create group projects or learning communities in their classes • Percent of courses including team projects • Percent of graduating seniors reporting participation in group study • Percent of students reporting that the grading and evaluation process used by the instructor allowed them to actually demonstrate what they knew • Percent of courses allowing or requiring multiple drafts, rewrites, or resubmissions of student work • Percent of courses requiring students to speak in class • Average number of pages of writing required by course • Average number of pages of assigned reading required by course • Percent of seniors graduating without writing a major research paper during their undergraduate career
Increase student opportunities to engage in independent research and creative work; develop external funding to support this effort	• Number of undergraduate students involved in faculty research • Percent of courses requiring students to engage in independent research papers, projects, presentations or similar exercises • Percent of courses requiring students to use the library as a research resource • Number of faculty research or development grants awarded yearly • Number of research grants • Supported graduate students (paid from department accounts)/faculty ratio

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

I. EDUCATIONAL QUALITY (cont.)

Process or Input Objectives and Measures

Objectives	Measures
Increase opportunities for capstone educational experiences	• Number of internships, practica, or other practice-oriented courses offered per student • Proportion of students completing a senior project • Proportion of students involved in independent study
Provide students with greater access to computing and information technologies	• Amount of research and study space per student (graduate or undergraduate) • Amount of software per student in the audiovisual center • Telecommunications and computing resources per student
Extend access to information technologies in classrooms	• Percent of faculty using new technology for instruction

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

II. ACCESS/DIVERSITY/EQUITY

Outcome Objectives and Measures

Objectives	Measures
Improve retention and graduation rates (for different groups of students)	• Number of degrees conferred for different groups of students • Program completion rate for different groups of students

Process or Input Objectives and Measures

Objectives	Measures
Increase admission rate for state residents	• Admission rate per in-state application • Admission rates per in-state high school graduate
Increase enrollment of state residents	• In-state enrollment as a percentage of total enrollment • In-state enrollment as a percentage of in-state high school graduates
Control student costs	• Adjusted tuition and fees for different groups of students
Maintain or increase graduate enrollment	• Total graduate enrollment • Number of graduate programs • Student population per program
Improve retention of graduate students	• Percent of graduate students completing program
Increase access to academic offerings for non-traditional students	• Number of programs and services for reentry and nontraditional students
Increase number of minority students enrolled	• Number of minority students enrolled • Number of minority students enrolled, as a percentage of total enrollment
Keep higher education affordable	• Number of four-year need based scholarships • Adjusted tuition and fees for different groups of students

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

III. EFFICIENCY

Outcome Objectives and Measures

Objectives	Measures
Reduce time to degree	• Average time to degree • Average number of credit hours per graduate
Reduce time to degree completion for students who seek to complete their degree in a timely fashion	• Intended versus actual time to degree

Process or Input Objectives and Measures

Objectives	Measures
Improve student progress toward degree	• Percent of students changing major • Dropout motives • Average course load taken • Percent of students reporting that they cut two or fewer classes • Withdrawal rate per section • Number of incompletes granted per student in a term
Improve efficiency of teaching function	• Enrollment per section • Attendance per section • Number of classes under-enrolled • Number of classes over-enrolled • Contact hours per FTE faculty • Number of undergraduate degrees awarded per FTE faculty
Increase teaching loads	• Number of credit hours per faculty FTE
Improve efficiency of research function	• Books produced by staff each year • Chapters in books per year • Journal publications per year by type of journal (refereed, peer reviewed) • National, regional, and local papers presented • Average number of conferences organized, attended • Percent of time spent on research

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

III. EFFICIENCY (cont.)

Objectives	Measures
Improve efficiency of research function (cont.)	• Number of staff participating as editors of books and journals • Number of summer grants awarded yearly • Number of staff available for research • Number of postgraduates by faculty • Number of new inventions and developments as a result of research • Number of current research projects • Competitiveness of the research program in regard to research programs of equal value • Number of staff supported from external research grants • Value of research grants • Amount of contract research
Improve efficiency of administrative function	• Institutional grant aid as a percent of tuition and fee income • Institutional comparisons of significant sources of revenue (tuition, state appropriations, private gifts, federal contracts) • Academic activity cost (per student, per total revenues) • Expenditure on central administration (per student, per total revenues) • Library costs (per student, per total revenues) • Expenditure on computer services (per student, per total revenues) • Expenditure on career services and student organizations (per student, per total revenues) • Academic staff/support staff ratio • Student/staff ratio
Reduce maintenance backlog	• Expenditure on premises

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

IV. CONTRIBUTION TO STATE NEEDS

Outcome Objectives and Measures

Objectives	Measures
Increase the education level of the citizens of the state	• Resident participation rate in the higher education sector • Percent of state residents with some college • Percent of state residents with a two-year degree, four-year degree, etc.
Work force development for economic development	• Business/employer surveys regarding adequacy of customized training programs • Placement rate of graduates in the work force
Increase the number of graduates with skills critical to the state economy	• Number of graduates by skill category, field of study
Increase the commercialization of research developed in state universities	• Number of patents awarded • Estimated dollar value of inventions • Number of business partnerships • Usefulness of research results for trade and industry
Improve career-readiness of graduates and system responsiveness to state businesses	• Average time lag between graduation and first job by field of study • Average income of graduates after X-years by field of study • Unemployed/graduates ratio by field of study • Adequacy of the graduate output with regard to the labor market • Community members' judgments of college career preparation programs • Employer satisfaction with graduates • Relevance of education in relation to professional activities years after graduation

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

IV. CONTRIBUTION OF STATE NEEDS (cont.)

Process or Input Objectives and Measures

Objectives	Measures
Increase public service contribution of faculty in communities, public schools and business and industry	• Quantity, quality, duration, participation rates of continuing educational activities • Ability of continuing education programs, courses, and services to meet the needs of various groups in the community, including the young, old, different economic classes, and unemployed • Number of faculty involved in continuing education • Community awareness of continuing education and community services programs • Student levels of public service • Number of public service opportunities offered on campus • Number of research projects conducted on behalf of government, companies, societies • Adequacy of communication of scientific results for the population • Technological merits of research • Scientific merits of research • Social merit of research: contribution to social welfare
Increase the amount of sponsored research	• Number of sponsored research projects • Dollar value of sponsored research projects
Expand off-campus access to classes and educational resources	• Number of outside groups using college facilities • Number of educational and cultural facilities available to adults from the region • Cultural activities for outsiders: number, duration, participation • Recreational activities for outsiders: number, duration, participation • Relations with external organizations

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

IV. CONTRIBUTION OF STATE NEEDS (cont.)

Objectives	Measures
Use university resources to support state economic development	• Level of commercial use of infrastructural facilities (laboratories, library) • Amount of contract education • Number of consultancies or advisory relationships to government and government authorities • Number of consultancies to industry and private organizations • Number of consultancies to community organizations • Number of collaborations with institutes and research stations

TABLE 1
EXAMPLES OF REPORTED STATE HIGHER EDUCATION OBJECTIVES AND ASSOCIATED MEASURES

V. CONNECTION AND CONTRIBUTION TO OTHER EDUCATION SECTORS IN THE STATE

Outcome Objectives and Measures

Objectives	Measures
Improve success of under prepared students	• Percent of students entering remedial program who graduate with a degree
Improve links between community college and university	• Percent of transfer students who graduate
Improve primary and secondary education processes	• Entry qualifications of students • Average SAT/ACT scores of entering students • Scores on state-wide exam
Improve the quality of primary and secondary school teachers	• (No measures identified)

Process or Input Objectives and Measures

Objectives	Measures
Improve transfer rates from community colleges to universities	• Transfer rates within higher education system • Percent of students who transfer into the university • Percent who transfer out of the university • Number of major feeder and transfer institutions • Reasons for transferring • Organization of coordinating programs among institutions • Participation in coordinating bodies • Articulation of continuing education and community service to other college programs • Student satisfaction with preparation for transfer • Graduates' and other former students' satisfaction with transfer preparation • Before/after transfer comparisons (GPA, satisfaction) • Comparisons with non-transfer students at the same institution (progress rates, GPA, satisfaction, skill-level, completion rates)

APPENDIX B.

Figure 1: Multi-Level development of Productivity Improvement Strategies