

Student Outcomes Information for Policy-Making

**Final Report of the National Postsecondary
Education Cooperative Working Group on Student
Outcomes from a Policy Perspective**



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September 1997

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Suggested Citation

U.S. Department of Education. National Center for Education Statistics. *Student Outcomes Information for Policy-Making*, NCES 97-991, prepared by Patrick Terenzini for the Council of the National Postsecondary Education Cooperative Working Group on Student Outcomes from a Policy Perspective. Washington, DC 1997

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STUDENT OUTCOMES INFORMATION FOR POLICY-MAKING

In this 'age of accountability,' administrators and others have been especially concerned about educational outcomes and their measurement. Postsecondary institutions . . . are also being called on to provide factual evidence that they and their programs are providing the benefits that were intended, and that these outcomes are being produced in a cost-effective manner (Lenning, 1977, p. ix).

Lenning's description of some of the challenges facing postsecondary education in the U.S. may be nearly two decades old, but some things are slow to change. Currently, many members of Congress, governors, state legislators, top business executives, and others consider the information currently available on America's postsecondary institutions to be inadequate for evaluating the quality of the education being delivered and for making decisions on policy or the expenditure of public funds (e.g., Romer, 1995). A number of forces have combined to increase the pressure on administrators and faculty members in public institutions to demonstrate the educational effectiveness of their institutions. Three of the most pressing include:

- Increased competition for public funds from other public services (e.g., highways, prisons, social services) even as the resource base in most states erodes;
- State appropriations that fail to keep pace with inflation; and
- Legislative demands for accountability and increased productivity.

While public institutions may feel these particular pressures more keenly than private institutions, other, equally-threatening sources of pressure make no distinction between public and private institutions in America's postsecondary system. ("Postsecondary education," as used here, refers to formal instruction beyond that provided in secondary school. It may be delivered in traditional colleges or universities, proprietary schools, tribal colleges, the military, corporate or industrial education programs, or other, similar settings. It does not include self-directed learning, such as occasional programs that may be delivered by libraries or museums, nor knowledge/skill development acquired through other informal, unstructured means.) Postsecondary educational institutions in the independent sector share with their public counterparts susceptibility to such pressures as:

- The spiraling costs of attendance and operation;

- Accrediting agency requirements to assess student learning outcomes and to incorporate the findings in operational and programmatic planning and decision-making;
- Corporate and government leaders' alarm about America's economic competitiveness in a global market;
- Writers both inside the academy (e.g., Anderson, 1992; Bloom, 1987; Huber, 1992; Smith, 1990) and out (e.g., Sykes, 1988) who have attacked colleges' and universities' reward structures and current directions;
- News stories of financial mismanagement (and in some cases fraud) or educational malfeasance at both prestigious and obscure institutions;
- Colleges' and universities' reluctance to engage in outcomes assessment and slowness in responding to external requests for outcomes information, which have fueled legislative and public frustration and impatience;
- Graduates who cannot find postbaccalaureate employment despite a healthy economy; and
- Employers' increasing dissatisfaction with the skills their new employees bring to the workplace from their baccalaureate programs.

Proprietary degree-granting institutions (perhaps because their programs are both shorter and more specifically targeted at employment than are those of not-for-profit institutions) appear to be less open to criticism relating to employer dissatisfaction, program completion, and employment placement rates than are institutions in other postsecondary sectors (e.g., Accrediting Commission of Career Schools and Colleges of Technology, undated). Their achievements notwithstanding, however, proprietary institutions confront many of the same educational "quality" issues facing their not-for-profit counterparts.

The National Postsecondary Education Cooperative (NPEC), with the support of the U.S. Department of Education's National Center for Education Statistics, was formed to develop ways to improve the utility of information for policy-making at all levels and in all sectors of the postsecondary education enterprise. NPEC is a compact of data users and providers with representatives from a wide array of individual campuses, state higher education systems, and postsecondary education organizations, agencies, and accrediting bodies. One of NPEC's first seven projects involves identification of student outcomes that could inform policy-making at the campus, state, and national levels and in all postsecondary sectors. A variety of institutional performance indicators are, of course, already available

(e.g., admissions, registration, and financial aid systems at the institutional and state levels, and IPEDS at the national level). While such data are often useful for addressing some policy issues, the information they yield tends to be restricted to students' precollege characteristics and various "production counts" (e.g., students enrolled, credit-hours produced, degrees awarded). Current student data systems yield little information about an institution's educational effectiveness—the outcomes it produces. Such questions as "What and how much do students learn from any given postsecondary education experience?" go largely unaddressed by current student data systems. To answer such questions, one must look beyond this operational perspective to examine current and projected institutional, state, and national student outcome data needs and deficiencies in a policy context. **The purpose of this report is to provide a model for examining, from a policy perspective, postsecondary education data priorities in the student outcomes area, as well as (at a later point in time) in other areas such as instructional costs, postsecondary access, workforce development, and new delivery systems.**

The report first identifies a range of policy issues currently facing American higher education. NPEC's "Student Outcomes from a Policy Perspective" Working Group developed the list. A taxonomy of student educational outcomes is then presented, and a procedure for linking the outcomes and policy taxonomies is presented as a first step in identifying those outcomes with the greatest potential for informing policy-making in postsecondary education. A set of criteria for selecting specific outcomes within each outcome's domain is then introduced, as is a process for applying those criteria. The report closes with a series of recommendations for future steps as work on the development of useful outcomes information for policy-making proceeds.

A Taxonomy of Policy Issues

The introductory portion of this report described a number of the pressures pushing postsecondary education toward student outcomes assessment and a common set of outcome variables and measures. That discussion, of course, does not exhaust the list of pressing issues confronting the postsecondary system. To bring some conceptual order to the many and varied policy issues that are current in postsecondary education or might be anticipated for the future, Robert A. Wallhaus drafted a taxonomy of policy issues as a starting point for discussions of the Student Outcomes from a Policy Perspective Working Group. The original draft was subsequently revised by Wallhaus and Patrick T. Terenzini, and revised still further by the Student Outcomes from a Policy Perspective Working Group.

Table 1 displays that taxonomy of policy issues. The taxonomy is intended to be relevant to all postsecondary levels and sectors, whether public or private, proprietary or not-for-profit. It contains fifteen categories, and, as might be expected, some of the issue areas are more likely than others to be informed by student outcomes information. Appendix A contains a more detailed discussion of the meaning of each policy domain label and provides additional examples to clarify the information provided in Table 1.

Defining a Student Outcome

Before consensus can emerge on what outcomes to include in an outcomes-information-for-policy system, the meaning of the term "outcome" must be defined. The Working Group uses "outcome" to refer to *those education-related consequences of students' postsecondary educational experience*. The outcomes with which this report is concerned are those believed to be attributable to the postsecondary experience rather than to normal maturation, societal changes, or other influences or forces beyond postsecondary education's sphere of influence.

Outcomes may be short- or long-term, occurring during or after a student's postsecondary experience. They may be direct (i.e., an immediate consequence of some postsecondary educational experience) or indirect (i.e., due to postsecondary education's effect on some intervening variable that is more directly related to an outcome). Outcomes may also be intended (e.g., cognitive development, employability) or unintended (e.g., enhanced athletic ability, marriage, dependence on chemical substances). A substantial number of outcomes, of course, might be identified as potentially associated with participation in a formal postsecondary education process. For that reason, the outcomes taxonomy proposed is restricted to those outcomes that are typically *intended outcomes* of some postsecondary education experience and within the power of postsecondary institutions to shape to educational advantage through programmatic or policy interventions.

A Proposed Taxonomy of Intended Student Outcomes

Most of what we currently know about what happens during, and as a consequence of, students' formal educational experiences has been developed from studies of traditional undergraduate college and university students (see, for example, Feldman & Newcomb, 1969; Pascarella & Terenzini,

TABLE 1. A TAXONOMY OF POLICY ISSUES

INPUT ISSUES	
Access:	Diversity (broadly defined), minority participation (including students, faculty, and staff), affirmative action, immigration, program availability, geographic accessibility, transfer and articulation, access to the benefits of postsecondary education
Affordability:	Costs to student/family, sources and adequacy of financial aid, family income and ability to pay, students education-related indebtedness, loan default rates
Financial Support:	Trends in sources and amounts of revenues, cost of instruction, privatization, total cost, level and composition of private/state/federal funding for research, indirect-cost recovery, performance-based funding
Student Preparation for Postsecondary Education:	Need for remediation, admission standards, secondary-postsecondary linkages, teacher preparation
PROCESS ISSUES	
Accountability:	Overall institutional quality, assessment policies, performance indicators (e.g., persistence, time-to-degree, degree completion, job placement rates), governance, regulatory requirements and reform, consumer disclosure and choice
Campus Climate:	Racial/ethnic and gender relations, sexual harassment, crime, speech codes
Facilities and Equipment:	Condition of space, capital investment, technological up-grades, deferred maintenance
Faculty:	Workloads (volume and nature), reward systems, tenure, compensation, relations of faculty research to state needs, distribution of full-/part-time faculty, supply and demand, diversity, faculty development
Productivity:	Program duplication, elimination of administrative bloat, cost savings, efficiency (e.g., retention, time-to-degree, degree completion), cost-effectiveness, return on investment, incentives for improvement
Technology:	Access to information; learner access and productivity; investment costs; impact on current policies, organizational structures, financing and accounting mechanisms, instructional support services, and personnel; curriculum and credentialing control; impact on course content, instructional methods, role of faculty, employment skills, and assessment
END-PURPOSE ISSUES	
Continuing Education and Life-Long Learning:	A number of issues related to distance education, but also to more generic matters, including content, place of instruction, when learning occurs, how it occurs, who does the teaching, who sponsors it, and who credentials it.
Public Service/Outreach:	Agricultural extension, land-grant colleges, rural health care, community and national service
Quality/Educational Effectiveness:	Student achievement and other outcomes (what and how much is learned), learning productivity
Quality of Graduate and Professional Education:	Heterogeneous issues, many similar to those relating to undergraduates (e.g., access, quality, productivity, workforce preparation and retraining)
Workforce Preparation and Retraining:	Occupational supply/demand, employer expectations, educational and training opportunities, geographic access, postsecondary-workforce articulation, job/employment rates, economic development

1991). One might reasonably argue, however, that most current taxonomies of postsecondary student outcomes are sufficiently generic to be applicable to a wide variety of diverse learners and teaching/learning contexts. What varies, this line of argument maintains, is the degree to which learners change on any given outcome, the sources of influence on those changes, and the value or worth individuals or institutions attach to a particular change as a legitimate educational outcome to be promoted. Moreover, while the area, degree, and sources of change might vary substantially with student characteristics (e.g., gender, race/ethnicity, age, ability, learning style), the learning setting (e.g., method of instruction, learner activities, content and/or skills to be learned), or the postsecondary education sector, the possible dimensions along which a learner may change might usefully be thought of as relatively common across postsecondary learners, settings, and sectors.

Appendix B summarizes three popular outcomes taxonomies the Working Group considered. Each has its strengths and weaknesses, depending upon the use for which it was intended. Astin's (1976, 1993) model was created to guide the selection of variables for a large, national research program. Ewell's (1984) classification was developed to help guide institutions in their development of student outcomes assessment programs, and the NCHEMS structure (Lenning, 1977) was constructed to provide a common vocabulary for the "full range" of postsecondary education outcomes data collection, exchange, and analysis in support of evaluation and planning, primarily at the institutional level.

Following a review of the structure and primary characteristics of each of these typologies, the Student Outcomes Information from a Policy Perspective Working Group concluded that none of these typologies was satisfactory for purposes of identifying student outcome variables likely to be useful for policy-making at all levels and in all postsecondary sectors. Astin's four-fold model was judged to be too general, while the NCHEMS structure was considered overly and, for present purposes, unnecessarily complex. Ewell's classification has much to recommend it, although some members considered it not sufficiently detailed as a structure with which to begin a process of consensus building on specific, policy-relevant outcomes that might become part of an outcomes-information-for-policy system.

The proposed taxonomy is intended to be generic, describing educational outcomes which one or more types of postsecondary institution seek to achieve. The importance any given institution attaches to a specific outcome will, of course, vary with the postsecondary sector, institutional mission, and clientele. Thus, it is important in this discussion to differentiate an educational outcome or goal from the routes institutions in various sectors of the postsecondary system may take to achieve *their* goals and

desired outcomes. The taxonomy is intended to be applicable and useful to all postsecondary institutions, but not all parts of it will be equally important or relevant to all institutions, even within the same sector.

Table 2 offers a twelve-domain outcomes taxonomy. The structure was initially developed by Robert A. Wallhaus for the NPEC Student Outcomes Information from a Policy Perspective Working Group and was subsequently revised by Wallhaus, Patrick Terenzini, and the Working Group. The overlap with Ewell's (1984) classification (see Appendix B) is apparent, although certain outcomes (e.g., educational success, success in transitions, quality of life) subsumed under one of Ewell's major categories are given greater prominence in the proposed taxonomy. In addition, the proposed model (unlike Ewell's) also includes a category for "Economic Benefits." It should be noted that the Working Group does not consider the first three outcome domains listed in Table 2 ("Communication and Computational Skills" through "Content Learning") to be unrelated to "Occupational Preparation" and "Workplace Skills" outcomes. Those three domains are highly associated with job performance. More detailed descriptions and examples of the kinds of outcomes comprising each domain are given in Appendix C.

Given the proposed taxonomy of student educational outcomes, the challenge remains to develop consensus on this structure and—more importantly for any effort to develop an outcomes-information-for-policy system—to find a means for linking relevant outcomes information with policy issues that are important currently or are likely to be in the future. The next several sections describe a set of related procedures for making such linkages.

Linking Student Outcomes with Policy Issues

Having developed what were considered adequate taxonomies of major policy issues and student outcomes, the Student Outcomes Information from a Policy Perspective Working Group set about the task of identifying those outcomes they considered to be most relevant to one or more of the policy issues they had identified. As the process of identifying policy-relevant outcomes progressed, however, it became readily apparent that Working Group members had different conceptions of what an "outcome" is. Astin's (1993) input-environment-outcomes (or I-E-O model) was introduced as a means of clarifying and differentiating outcomes from the experiences or processes that produce those outcomes.

TABLE 2. A TAXONOMY OF STUDENT OUTCOMES

Educational/Training Achievement
<p><u>Academic</u></p> <p>Communication and Computational Skills: Reading, writing, and oral communication; quantitative/computational skills; information acquisition skills (technological and otherwise)</p> <p>Higher-Order Cognitive and Intellectual Development: Critical thinking, problem solving, analytical and evaluative skills, formal and postformal reasoning, conceptual complexity, creativity, moral reasoning (as a process)</p> <p>Content Learning: General (breadth) and specific (depth) of knowledge</p> <p><u>Occupational</u></p> <p>Occupational Preparation: Knowledge and skills specific to an occupation; occupational choice; occupational status; job placement; licensure; job satisfaction; performance; productivity; promotability; occupational mobility; employer satisfaction, occupational aspirations</p> <p>Workplace Skills: Motivation to perform in the workplace, dependability, adaptability, persistence, initiative, leadership skills, ability to work independently and in groups</p> <p><u>Developmental</u></p> <p>Psychosocial Development: Autonomy, tolerance for diversity, intellectual orientation, interpersonal skills and maturity, motivation (generic), identity development, self-concept and self-esteem, personal adjustment</p> <p>Attitudes, Values, and Beliefs: Occupational, educational, cultural (arts), social, political, religious, interpersonal (e.g., diversity), standards of conduct, orientation to life-long learning</p> <p>Civic Development: Group affiliations/memberships, citizenship, community involvement, voting participation</p>
Attainment of Student Goals
<p>Educational Success: Retention/persistence, educational aspirations, educational attainment, course/program/ degree completion, time-to-degree, satisfaction</p> <p>Success in Transitions: Education-to-work, education-to-education, work-to-education</p> <p>Economic Impacts: Income, return on investment, standard of living, geographic mobility, educationally-related financial indebtedness</p> <p>Quality of Life: Sense of well-being, health, consumer behaviors, savings and investment behaviors, leisure activity</p>

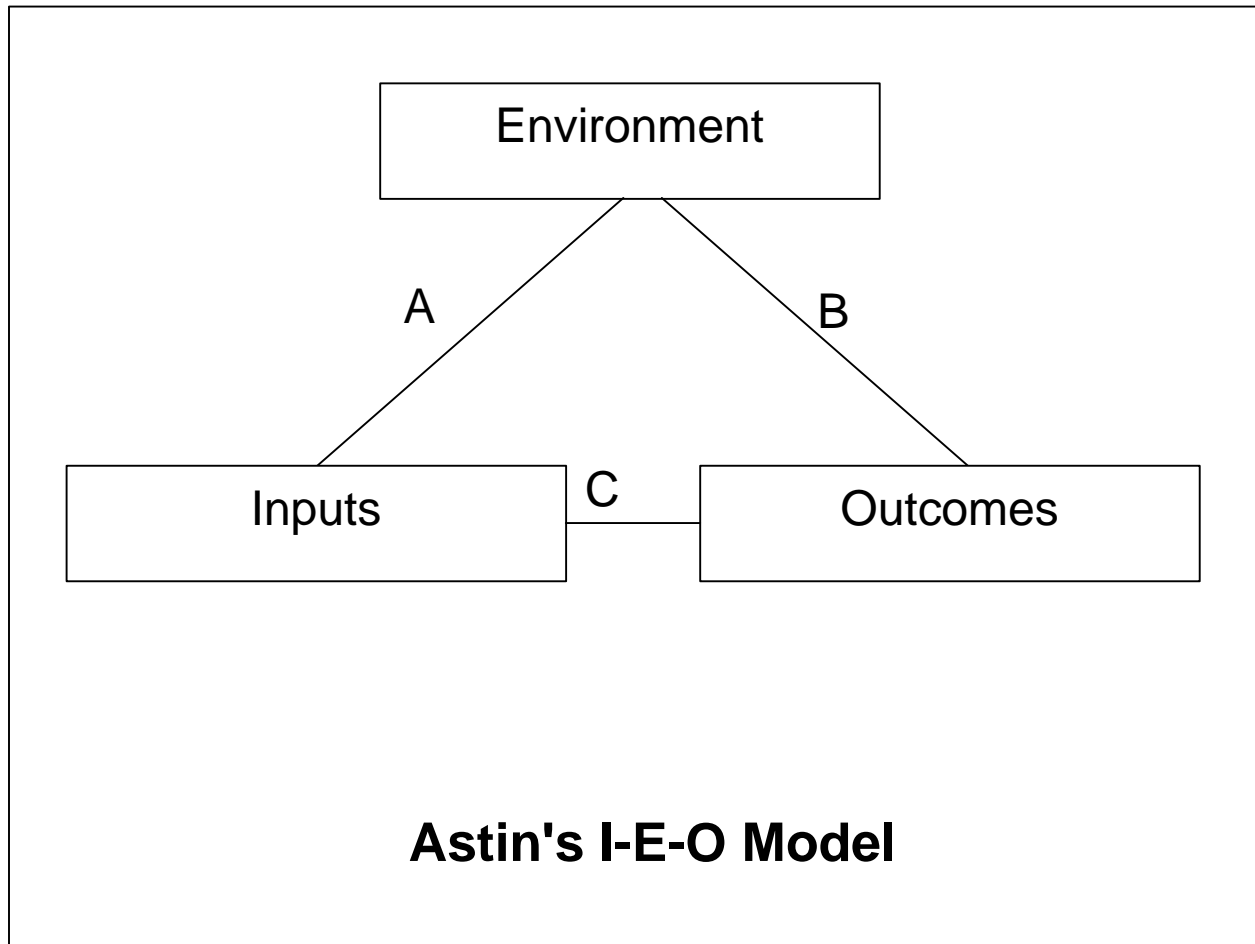
Figure 1 presents a schematic representation of Astin's model, which contains three sets of constructs or variables involved in studying and measuring the influences on students postsecondary experiences on student growth or change. In particular, this model is a useful tool for identifying and estimating the effects of those postsecondary experiences over which administrators or policy makers might exercise some programmatic or policy control to enhance educational effectiveness.

The **inputs** component of Astin's model includes a wide variety of personal, family, and educational background characteristics that students bring with them to their postsecondary experience. These traits include such things as academic and intellectual abilities, precollege achievements (academic and otherwise), goals and motivation levels, degree and career aspirations, and a range of demographic, personal, and family characteristics, such as gender, race/ethnicity, socioeconomic status, age, marital status, and citizenship. "Inputs" also refers to a variety of other obligations students may have, including those to family and/or work.

The **environment** of Astin's I-E-O model includes all those things that might influence what and how much students learn or change. At least four general, institutional-level sources of influence on student outcomes are identifiable: *Curricular influences* (e.g., courses taken, major field), *formal instructional experiences* (e.g., type and quality of instruction, interaction with faculty in class), *out-of-class experiences* (e.g., peer relations, place of residence, informal contact with faculty, work and/or family obligations), and *institutional characteristics* (e.g., type and control, curricular mission, size, selectivity, environment or culture). Institutional characteristics would also include the human, financial, and physical resources an institution has available to it. These resources shape the educational environment and students responses to it in both obvious and subtle ways. Student effort is yet another relevant variable. While one might consider it an input, the case can be made that the effort students exert *during* their college experience (and in response to it) is a different characteristic from the initial level of motivation students bring to college. In any event, student effort has been well established as an important influence on the degree of student change or development (Pascarella & Terenzini, 1991).

These environmental variables—whether at a given institution or across institutions—comprise most of the programmatic and policy levers available to campus administrators and policy makers to shape students postsecondary experiences and, thereby, the outcomes of postsecondary education.

Figure 1



Outcomes in Astin's I-E-O model correspond directly to the student outcomes discussed earlier and listed in Table 2. They are, quite simply, the "products" of students' postsecondary experiences, the effects of attending a postsecondary institution.

Astin's model is a parsimonious—but far from simple—representation of the dynamics and processes of postsecondary impact on students. The model specifies that the background traits and experiences students bring with them to a postsecondary setting (i.e., the "inputs") have both direct and indirect effects on outcomes. The effect of background characteristics on outcomes is direct (indicated by path C in Figure 1) in that the best predictor of an educational outcome (say, level of cognitive development) is the students level on that variable at the time the postsecondary experience was begun. Background characteristics, however, also shape outcomes indirectly through their influence on the nature

of a student's encounter with the "environment" of the postsecondary setting, which, in turn, affects outcomes. This influence is represented by path A in Figure 1. The postsecondary environment and student's experiences in it, in turn, directly affect outcomes (path B).

While it was never intended for this purpose, Astin's I-E-O model can be used to advantage in linking policy issues and student outcomes. Specifically, the model provides a logic for identifying those policy issues that can be illuminated by student outcomes information. The close correspondence between the categories of policy issues given earlier (input, process, and end-product issues; see Table 1) and Astin's I-E-O model is readily apparent and provides a basis for linking policy issues and student outcomes. The "fit," however, is sometimes imperfect.

The final step in the process of identifying policy-relevant student outcomes information requires the conjunction of the two taxonomies as a means of bringing some focus to the discussion and selection of the most salient, policy-related student outcome variables. Just as it was apparent that not all policy issues were equally susceptible to illumination by student outcomes information, however, the Working Group's examination of the potential linkages between policy issues and student outcomes led to recognition that not all outcome domains are equally relevant to end-product policy issues. Within each policy category, the Working Group evaluated and determined the level of relevance of each outcome domain. Table 3 presents a policy-by-outcome matrix that summarizes the results of the policy-outcomes linking process. "Primary" and "Secondary" designations reflect the Working Group's perceptions of the degree of centrality of each outcome *to the policy debate*. Different postsecondary institutions with different missions will, of course, attach greater importance to some outcomes than to others. What may be "primary" for one institution may well be "secondary" (if not irrelevant) for another. Recognizing these imperfections in the assignments reported below, the Working Group nonetheless believes some such differentiation is important if any degree of parsimony is to be achieved. Without such differentiation, one would have to consider all outcomes to be equally central to the policy debate.

The policy issues-by-outcome-by-relevance framework accomplishes several objectives. First, it adds parsimony. Within the End-Purpose Issues category (the policy areas to which outcomes information is arguably the most central), it reduces the domains of the original student outcomes taxonomy from thirteen to the "primary" seven.

Second, despite the potential points of debate, the framework offers a starting point for a process of reaching consensus on which outcome domains should be given the most attention. Such a

TABLE 3. LINKING OUTCOMES AND POLICY ISSUES

Policy Issues	Relevance of Outcomes Information	
	Primary	Secondary
End-Purpose Issues		
Quality and Educational Effectiveness	Communication and Computational Skills Cognitive and Intellectual Development Content Learning Occupational Preparation Workplace Skills Educational Success Success in Transitions	Attitudes, Values, and Beliefs Economic Benefits Social Development Psychosocial Development Civic Development Quality of Life
Workforce Preparation and Retraining	Primary Outcomes as Above Workplace Skills	Secondary Outcomes as Above (minus Workplace Skills)
Quality of Graduate Education (selected)	Primary Outcomes as Above (as they relate to graduate ed.)	Secondary Outcomes as Above (as they relate to graduate ed.)
Continuing Education and Life-Long Learning (selected)	Primary Outcomes as Above	Secondary Outcomes as Above
Process Issues		
Accountability (e.g., assessment policies, regulatory requirements and reform)	Primary Outcomes as Above (re. adequacy of current policies and practices)	No Others Relevant
Campus Climate (selected)	Attitudes, Values, and Beliefs Psychosocial Development Civic Development	No Others Relevant
Facilities and Equipment	None Relevant	None Relevant
Faculty Issues	None Relevant	None Relevant
Productivity (selected)	Primary Outcomes as Above	Secondary Outcomes as Above
Public Service/Outreach	None Relevant	None Relevant
Technology (learning-related uses)	Primary Outcomes from End-Product Categories (above)	Secondary Outcomes from End-Product Categories (above)
Input Issues		
Access	None Relevant	None Relevant
Affordability	Student Indebtedness Economic Impacts Educational Success (persistence, degree completion, time-to-degree)	No Others Relevant
Financial Support	None Relevant	None Relevant
Student Preparation	None Relevant	None Relevant

process can lead to further discussions on more precise identification and specifications of variables within each domain (see below).

Third, the framework identifies a number of postsecondary education policy issues that are clearly important and urgent, but which may be more precisely thought of as sources of influence on student outcomes (i.e., part of the postsecondary educational "environments"), rather than as outcomes themselves.

Criteria for Evaluating an Outcomes Policy-Relevance

In order to specify more precisely the appropriate outcomes information for policy making, it will be necessary to reach some consensus on what variables within each outcome's domain should be included. Making those selections requires a set of criteria or principles for choosing among alternative possibilities. In the present case, criteria may be of at least two separate, but interrelated, kinds: conceptual and methodological.

Conceptual criteria involve philosophical and/or political considerations. They can be thought of as a set of issues relating to the question "Why should this outcome be included in the data set under development?" Methodological criteria involve technical issues of measurement, availability, and data collection design. The criteria listed in Table 4 constitute the set of considerations the Working Group believes should be taken into account in evaluating the merits of an outcome variable for policy-making. The criteria are categorized into three "screens," the purpose of which is described in the next section. (Appendix D provides a more detailed description of each criterion.)

Applying the Criteria

The final challenge is to apply the proposed criteria to each of the policy and outcome domains and, in the process, to refine outcome variable specifications within each domain "in such a way that the resulting measures remain credible across a diverse postsecondary community and with such key external audiences as employers and policy makers" (Ewell, 1996, p. 23).

TABLE 4. CRITERIA FOR EVALUATING POLICY-RELATED OUTCOME VARIABLES

<p style="text-align: center;">First-Screen Criteria (Conceptual Considerations)</p> <p>Relevance: How closely is the outcome related to an important policy issue?</p> <p>Utility: What is the potential of information on this outcome for guiding action to achieve policy objectives?</p> <p>Applicability: To what extent will information on this outcome meet the needs of multiple stakeholder/user groups?</p> <p style="text-align: center;">Second-Screen Criteria (Conceptual Considerations)</p> <p>Interpretability: Will information on this outcome “communicate” with users?</p> <p>Credibility: How believable is information on this outcome likely to be for policy makers?</p> <p>Fairness: Will the information bias or mislead in ways that may disadvantage one group of stakeholders or users vis-a-vis another?</p> <p style="text-align: center;">Third-Screen Criteria (Methodological Considerations)</p> <p>Scope: Are the needed data “census-type” (i.e., drawn from all institutions and students) or “knowledge-base” (i.e., drawn from another data collection design, such as a sample survey)?</p> <p>Availability: Do data on the outcome already exist? Are they accessible? Does a “technology” exist for collecting data on the outcome?</p> <p>Measurability: How is the outcome to be operationally defined and measured, and how methodologically sound are those measures likely to be? How much error can be tolerated in the measure being evaluated, given the policy question(s) being addressed?</p> <p>Cost: How expensive will it be to obtain information on the outcome?</p>

Applying the criteria will require reaching some consensus on which outcomes *within* each domain should be evaluated for possible inclusion in the data set. The goal of this process would be to identify outcomes that are both more specific and more narrowly defined than those currently listed in the outcomes taxonomy. In the case of the "higher-order cognitive and intellectual development" domain, for example, a number of possible skills are listed (e.g., critical thinking, problem-solving, analytical and evaluative skills).

Which of those are to be included in the data set: All of them? Some of them? Which ones? To apply the criteria, a finer-grained level of specification is needed in all domains. Although greater specification risks some loss of consensus in trying to put too fine a point on these selections, such refinement would appear to be a necessary and logical step.

The Working Group believes that the inherent conceptual and policy value of an outcome should take precedence in the selection process over technical considerations. Methodological matters are nontrivial ones, of course, but outcomes found to be strong on a number of the conceptual criteria ought not to be rejected for being methodologically problematic. Rather, ways should be found to develop appropriate measures or procedures for obtaining useful information for policy-making.

To apply the "three-screen" process, selection panels could be used both to specify outcomes more precisely and to evaluate their merits for policy-making. These panels would consist of individuals representing diverse data user and supplier groups (from both inside and outside postsecondary education) and would make the initial selection of specific outcomes within a specific domain (i.e., one panel for communication skills, another for computational skills, another for higher-order cognitive and intellectual development, and so on). It may be prudent to include on each panel at least one individual who is familiar with current state and national data systems, as well as at least one person with strong research design and analysis skills and experience in studying the impacts of college on students.

The "first-" and "second-screen" criteria deal with possible answers to the question of why any given outcome variable might be important for policy-making. An outcome judged wanting in terms of the first screen (i.e., relevance, utility, or applicability) is probably not worth considering further. Outcomes passing that screen, however, should then be examined on the criteria comprising the second screen: Interpretability, credibility, and fairness.

Assuming the first- and second-screen evaluations indicate an outcome has promise, an outcome's "third-screen" merits should be evaluated. These methodological criteria involve *process* considerations related to data collection, measurement, and the human, technical, and financial resources required to assemble information on an outcome. Whereas the first- and second-screen criteria addressed questions of why information on an outcome variable might be important to policy-making, these third-screen address questions of how—and how easily—information on an outcome might be gathered, how sound those data are likely to be, and how costly gathering the data might be.

One should not expect any outcome variable to "score" highly on all criteria at each screening level. The screens provide a hierarchical framework for evaluating whether a variable is "worth keeping around" for further consideration. In the end, variable selection will require judgments of a variable's overall "success" across all criteria.

At each screening level, panelists might undertake their evaluation of the merits of each outcome independently of one another. Panelists would have a worksheet for each outcome, listing all criteria and providing space for panelists to record written comments, as well as a summative rating (e.g., low, medium, or high) for each criterion. Panelists might also be asked to give an overall summative rating for each outcome at each screening level. At each level, panelists would then share their evaluations of each outcome with other panelists. The strengths and weaknesses of each outcome at that screen-level would be discussed, panelists explaining the reasons for their evaluations and benefiting from the thinking and judgment of other panel members, until consensus has been reached. The same process would then be repeated at the next screening level until consensus on an outcome's overall merits has been reached and a decision made on whether to include it in the data set to be developed.

Project Accomplishments and Implications

The Working Group's activities have, we believe, led to several accomplishments with implications for future NPEC projects. First, the Taxonomy of Policy Issues (see Table 1) has considerable promise for structuring discussions about data and information needs to inform policy-making in areas other than student outcomes. For example, discussions of policy-related data needs in such areas as academic and non-academic personnel, equipment acquisition, facilities, or financial support can be given focus and direction using this taxonomy. To a certain degree, the policy taxonomy can function as a touchstone for judging whether data systems (current or future) speak to policy issues.

Second, the Taxonomy of Student Outcomes (see Table 2) is the first of its kind specifically to address policy concerns. The taxonomy provides a categorization of student educational outcomes that is not only more comprehensive and specific than its predecessors, but also general enough to promote discussion and avoid definitional disputes.

Third, the process that led to the cross-referencing of policy issues and relevant student outcomes information in this project (see Table 3) can be readily applied in future efforts to identify and link relevant variable sets (e.g., in academic and non-academic personnel) to policy issues.

Fourth, the set of criteria for evaluating the policy-relevance of student outcomes variables can also be readily applied to variable sets in other areas, such as personnel, facilities, finances, or accounting. While the word "outcome" appears throughout that list of criteria, the underlying construct in each case is generalizable to variables of almost every kind.

Finally, the proposed process for applying those criteria is also generalizable to policy-related data discussions in most areas of postsecondary education. One of its major attractions is that variable selection and operationalization is that it involves "representatives" of major stakeholder, data supplier, and data user groups in a collaborative, consensus-building process.

Recommendations

Based on the foregoing, the Working Group offers the following recommendations:

- 1. The feasibility of the criteria and procedures for identifying specific and appropriate outcome variables proposed in this report should be validated.**

We believe the outcomes-by-policies model (see Table 4) has demonstrated its utility by identifying plausible linkages between student outcomes variables and relevant policy issues. We also believe the criteria and process for evaluating outcomes variables provide a workable basis for selecting and operationalizing outcome measures to inform relevant policy debates and decision-making, but that belief has yet to be established. Are the criteria comprehensive and conceptually sound? Is the proposed process feasible and effective for delineating more specific outcomes variables? Are the criteria appropriate in number and sufficiently and meaningfully defined?

2. Funding should be provided to support a pilot test of Recommendation 1 in a limited number of outcomes areas.

We believe it is prudent to test the questions posed in Recommendation 1 on a limited basis before attempting to apply the criteria on a more ambitious scale. We believe, moreover, that appropriate funding will be needed to undertake such a pilot. The pilot test should involve two selection panels (as outlined in this report) to evaluate the conceptual adequacy of the model and the applicability of the criteria. The charge to the selection panels in this pilot test would be to select a limited number of outcomes variables and recommend how they should be operationalized. We recommend pilot testing in two areas (one panel per outcome area) of the policy-outcomes matrix: 1) Occupational Preparation, and 2) Cognitive and Intellectual Development. We recommend the first area because it is one about which a good deal is known, and because instruments and data collection methods are already available in certain subcategories of that domain. In contrast, much less is known about the assessment of cognitive development on a large scale, particularly as this domain relates to policy making. We believe pilot testing in two domains that are sharply different with respect to available information and data collection methodologies will afford a realistic test of the model and criteria under different and important conditions. We also believe that external stakeholders (e.g., business leaders and other non-academic and non-NCES individuals) should be involved in the pilot project.

3. The stated purposes of the Student Outcomes from a Policy Perspective project have been completed, with one exception. Achievement of that particular goal (because it overlaps the charge of another NPEC project group) should be undertaken jointly by the Student Outcomes from a Policy Perspective Working Group and the Student Outcomes from a Data Perspective Working Group within the context of the pilot.

Initially, the Student Outcomes from a Policy Perspective project had four goals: "1) define policy issues at the national, state, and institutional levels which are concerned with student outcomes; 2) identify data which, if available, would lend insights into the various policy issues; 3) develop a conceptual framework for relating student outcomes data to specific policy issues; and 4) assess approaches to developing data priorities from a policy perspective and determine deficiencies in student outcomes data." The Working Group believes it has achieved Goals 1, 3, and 4 and begun the process of achieving Goal 2. Goal 2, however, requires efforts extending beyond this

project's scope, and, to some extent, it overlaps the charge of NPEC's Student Outcomes from a Data Perspective project. The Policy Working Group believes, however, that the pilot test proposed in Recommendation 2 can be an integral part in the achievement of Goal 2 and sees that goals full achievement as representing and requiring the conjunction of the work of the two groups. In our view, the pilot test constitutes a vehicle for uniting the goals and energies of the policy perspective and data perspective groups, which leads us directly to our next recommendation.

- 4. The pilot test selection panels should include representatives from both the "policy perspective" and "data perspective" Working Groups, as well as representatives from appropriate information user—and provider—groups.**

The proposed panels will, we believe, require representation from both the "policy perspective" and "data perspective" groups in order to maintain some continuity with the work these two groups have completed thus far. At the same time, however, it is well to remember that the implementation of a broadly usable outcomes information system is an inherently political process. Thus, the work of the selection panels is likely to benefit from (if not require) augmentation with representatives of data users and providers in the policy arena, as well as one or more individuals with significant expertise in measurement and research methodologies. Selection panels so constituted, we believe, are more likely than a group with a more restricted membership to produce recommendations that 1) meet the information needs of policy makers, 2) are methodologically sound and practicable in the eyes of information providers, and 3) will, consequently, meet with broader acceptance among policy information users and providers.

- 5. In constituting selection panels, care should be taken to ensure that the purview of each panel is conceptually reasonable.**

Certain of the outcome domains in the taxonomy developed by this project group are rather broad conceptually. For example, the "Communication and Computational Skills" domain comprises several, quite different subcategories of abilities (e.g., writing, reading, speaking, and computation). It seems unlikely that a selection panel could include representatives of data user- and provider-groups from important postsecondary institutional and policy sectors, as well as the necessary measurement and research experts, without becoming unmanageably large and probably

counterproductive. When an outcome's domain is broadly inclusive, we urge that discrete panels be constituted so as to recognize important—but policy-relevant—distinctions between and among outcomes.

6. **Efforts should be undertaken to explore the relevance and utility of the policy issues taxonomy and the process outlined in this report for linking policy issues with other relevant kinds of postsecondary education information (e.g., faculty or personnel information, budget and/or facilities information, and environmental influences on student learning).**

The policy taxonomy appears to be generalizable across postsecondary sectors (e.g., types of institutions, missions, clientele). Similarly, the process of linking policy issues with relevant kinds of information (in this case, outcomes information) also appears to be a generalizable procedure that might be usefully applied to other types of postsecondary education information. We believe it will be useful in the future, however, to think of the process of linking issues with information, and then applying the evaluative criteria developed in this report, as two distinct processes. Our experience suggests that the policy taxonomy, an information taxonomy, and the merger of the two are relevant, useful, and productive undertakings. As suggested in Recommendation 1, however, we are less certain of the extent to which the evaluation criteria developed in this project and their application to the intersections of policy and information are reasonable and workable in other informational sectors.

7. **Policy issues, not methodological issues, should drive considerations in all NPEC efforts to develop taxonomies, information models, and data collection plans.**

As indicated in this report's discussion of the need for two levels of conceptual criteria before consideration is given to methodological issues, the Working Group believes strongly that policy issues, not methodological considerations, should be the determining factor in the development of postsecondary education information systems. Information judged in the abstract to be relevant, useful, and applicable to important policy matters should not be ignored or dismissed because of its unavailability, problematic measurement, or (within reason) cost. Instead, ways should be sought to overcome obstacles to providing information that is needed and relevant to one or more important policy issues.

8. The Working Group's discussions surfaced a variety of relevant issues for future consideration. While beyond the Group's charge, they are important issues that should not be overlooked. They include: (Appendix E contains a more detailed description of each issue).

- a) The appropriate unit of analysis;
- b) The importance and policy relevance of inputs and environmental influences;
- c) Distinctions between "value-added" and "status-description" data needs;
- d) Building on what we already know;
- e) Variations in information needs according to functional responsibility and organizational level;
- f) Possible development of an outcomes performance "index"; and
- g) Responsibility for data collection.

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APPENDIX A

ELABORATION OF THE PROPOSED TAXONOMY OF POLICY ISSUES

Input Issues

Access, like student preparation (to which it is closely linked), has long been an issue for postsecondary education. Access issues have arisen and evolved as federal and state policy decisions over the past forty years have changed the missions of higher education and the demographic characteristics of the students it serves. "Access" refers to both a condition and a process. As a condition, the term refers to the extent to which postsecondary education is available to those who wish to take advantage of it. The root issue is one of equity and the equality of opportunities to participate. Access is a particular concern as it relates groups of citizens who have traditionally been excluded or whose access has been constrained. Such groups include not only those based on race/ethnicity or gender, but also on age, employment or socioeconomic status, physical or learning disability, geographic location, and so on.

"Access" as a condition is a policy matter in at least two senses. First, the term may apply to the equality of opportunities to enroll in some form of postsecondary experience or to attend some institution in a state higher education system. Virtually every state now provides equality of access in one fashion or another. "Access," however, can also refer to the equality of students' *opportunities to benefit* from participation in postsecondary education (Pascarella & Terenzini, 1991).

In terms of public policy, "access" can also refer to the processes by which institutions and governments seek to remove barriers from postsecondary education based on any of the conditions listed above. Processes affecting equal access include not only conventional marketing, recruiting, and admissions standards, policies, and practices, but also legal requirements (e.g., affirmative action and other equal opportunity legislation) intended to extend access to all who can benefit from postsecondary education. Policies governing interinstitutional transfer and articulation agreements constitute another subset of the processes influencing access to postsecondary education.

Affordability policy issues are, of course, closely related to those of access, although the former have become more urgent as the costs of postsecondary education have risen and sources of support have tended to dry up. "Affordability," in this policy taxonomy, is seen as a set of issues relevant most immediately to individual students and their families, but also indirectly to all state and federal taxpayers and their elected officials. Affordability topics include costs to students and/or families, the sources of financial aid and their adequacy, levels of schooling-related student and family financial indebtedness, and student loan default rates. These issues are likely to become even more salient than currently to the extent that federal efforts are successful in shifting more of the responsibility for supporting students to the states. Affordability, thus, is seen as a set of issues distinct from—but by no means unrelated to—Financial Support issues (see below).

Financial Support policy issues, in contrast to those of affordability, deal directly with institutional matters (e.g., endowments, philanthropy, grants, contracts, tuition) and governmental funding rather than with personal or individual financial matters. The issues are ones of both source and level of support for postsecondary education. This category includes such questions as how much aid state and/or federal governments should spend on postsecondary education as opposed to other public needs, what the sources of that aid should be, the distribution of financial support across different categories of

institutions (e.g., flagship campuses vs. other institutions in a state system) and students, and whether a particular service (e.g., student health care) should be provided by educational institutions or through private sources. This category also includes a host of other questions relating to the costs and funding of instruction and other postsecondary functions and services.

Student Preparation for Postsecondary Education issues are philosophical and political, as well as educational. States are wrestling with questions concerning the quality of their K-12 systems. These debates breed additional questions about the quality of teacher preparation programs and, in turn, questions about which level of their K-16 systems should be responsible for preparing students to do college-level work. (Should colleges and universities be offering remedial education to high school graduates?) Efforts to answer these questions encounter still other, important, tightly-interlaced, public policy issues. What should be the standards of admission to postsecondary education? What should be the relationships between K-12 and postsecondary education? Who should set the standards?

Process Issues

Accountability includes a range of policy issues, not all of which are related to student outcomes. As a general policy construct, the term refers to the responsibility (if not legal obligation) of campus and system administrators, as well as governmental officials, to provide superiors (ultimately the public) reports of their stewardship of public funds. Such officials have always had a professional responsibility to account for their use of public dollars, but since the mid-1970s, deteriorating state and national economic conditions have generated demands for greater accountability. Institutional and state education officials are under pressure to provide evidence that their institutions are producing outcomes consistent with their mission and worth the cost. Such demands raise a host of difficult philosophical, political, and methodological questions: Who should decide (and how) what the goals of a public institution or system should be? Who should decide (and how) what the definition and standards for "worth" should be? How are costs to be measured and then associated with outcomes (see Bowen, 1974)? Postsecondary institutions are audited annually in many areas of operation, of course, but calls for "accountability" in the present context are less concerned with tracing the precise expenditure of funds than with the justification of those expenditures. Accountability issues involve documenting operational and educational cost-effectiveness (see *Productivity* below), as well as matters of governance, reporting and related regulatory requirements and reform, and assessment policies (a prominent subset of regulatory requirements). Few campus, state, or federal officials and observers expect the pressures for accountability to diminish anytime soon.

Campus Climate issues and conditions mirror those in the society at large and have attracted greater attention in the wake of increasing incidents of harassment or outright violence based on gender, race/ethnicity, sexual orientation, religion, or other differences in the personal characteristics or beliefs of those involved. Perceptions of, and concern over, growing campus crime rates have also helped promote the belief that America's postsecondary institutions are increasingly more dangerous, intolerant places than they were at almost any time in their history. In the policy arena, efforts to promote greater tolerance through the promulgation of speech codes collide with First Amendment rights. Individual rights to safety and privacy clash with Constitutional protections against unreasonable search and seizure. Campuses are struggling to build a sense of community as law makers search for ways to a "kinder, gentler" world both on and off campus.

Facilities and Equipment issues always arise as a consideration when budgets become tight. While capital construction on most campuses has been curtailed, problems of deferred maintenance and equipment replacement costs (both favorite budget-balancing tools) continue to require attention. Indeed, given the current rates of technological development and enhancement, equipment maintenance and replacement costs (as well as associated facilities modification costs) are likely to become more urgent problem areas.

Faculty Issues have come in for closer scrutiny because faculty salaries comprise such a large portion of any postsecondary institution's operating budget and because faculty are central players in the teaching-learning process. Both the nature of faculty work (e.g., the distribution of effort between teaching and research) and its volume (both absolute and relative effort) have received, and are likely to continue to receive, close examination in a context characterized by wide divergence of opinion in philosophies of education, institutional missions, and state and national needs. Closely related to the issues of the nature and volume of faculty workload are questions about the appropriateness of current faculty reward structures, the policies and practices involved in the promotion and tenure processes, and, indeed, the need for tenure itself. Debates continue over the use of part- vs. full-time faculty, the gender and racial/ethnic composition of most faculties, and concern is rising over whether doctoral production in some disciplines is appropriate to the demand for graduates. Other issues relate to whether faculty development efforts constitute an effective means of reducing instructional costs and increasing instructional efficiency and effectiveness.

Productivity may refer to the total volume of production, but as the term is used in postsecondary settings, it also implies "efficiency," the relationship between what is produced and the cost of producing it. In postsecondary education (as in any business), productivity can be enhanced by any of three achievements: higher production at a steady cost, stable production at reduced cost, or increased production at lower cost. Enhancing productivity might involve elimination of program duplication either on the same campus or across campuses in a region or state. It might be related to growth in productivity through higher persistence and degree-completion rates. It can also take various forms of cost savings, as in privatizing or out-sourcing certain operations (e.g., residence halls, food service, bookstores, health services). Gains in productivity may also be realized through the use of incentives to enhance programs or operations.

Levin (1971) has suggested three categories of "efficiency." *Operational efficiency* (what most of us understand "efficiency" to mean) is the relation between inputs and outputs. Given the inputs, were maximum outputs achieved? A second form of efficiency, *allocative efficiency*, however, concerns the extent to which greater outcomes might have been achieved by varying the mix of inputs, the allocation of resources. Finally, says Levin, one might also speak of *preference efficiency*, which refers to the extent to which a particular mix of outputs was the most valuable combination for society: Were the right goals pursued?

Advances in **Technology** have put a host of policy, educational, and administrative issues on the table. In some cases, the issues overlap with those in other categories. Educational policy questions in this domain include how best to provide student and faculty access to the new information technologies, the instructional effectiveness of those new technologies (and how to assess it), how course credit will be awarded (e.g., when students take courses at a distance from another institution), how an institution's control of its curriculum can be maintained without stifling the creativity and flexibility of the new technologies, and the implications for changes in postsecondary education's credentialing function. Advances in information technologies have also raised significant questions about course content,

instructional methods, and the appropriate roles of faculty members and students. Administrative policy questions will impact current organizational structures; budgeting, financing, and accounting policies for allocating costs and distributing cost-savings, and instructional development and production support for faculty, students, and staff who use the new technologies.

End-Purpose Issues

Continuing Education and Life-Long Learning issues concern, to a large extent (but not exclusively), matters relating to standards and accreditation for learning programs that are technology-driven (primarily distance education efforts). In many states, institutions are reluctant to accept courses that are available "at a distance" without some assurance of high quality standards. Should guidelines for setting those standards differ from those for more traditional, nontechnologically-supported courses? Can existing accrediting associations reasonably be expected to address recognition/certification issues of programs offered at a distance dispersed among a number of institutions (e.g., the Western Governors University)?

Continuing education and life-long learning issues, however, extend beyond those that are technology-related. Spille (cited in Wallhaus, 1996) has suggested seven major changes, already underway in the U.S., that will require adaptations in current instructional content, structures, and delivery methods. These changes include those in 1) what is taught and learned; 2) where learning occurs; 3) when learning occurs; 4) how learning occurs; 5) who teaches; 6) who sponsors the learning, and 7) who credentials the learning.

Public Service/Outreach policy issues relate to the nature and extent of the role of postsecondary institutions (e.g., land grant colleges, their agricultural extension units, community colleges) in delivering (or assisting in the delivery of) services to local, state, and regional communities. The policy issues include provision of cultural enrichment to local communities, turf issues relating to the delivery of services, equity in the geographical distribution of service providers vis-a-vis areas in need of such services, and declines in financial support for cooperative extension efforts even as expectations grow for the delivery of such services in urban and inner-city settings. Whether, when, where, and how national and community service should be part of the undergraduate curriculum constitutes yet another area of concern.

Quality and Educational Effectiveness contains the set of policy issues involving questions of *what* and *how much* students are learning and the extent to which that learning is benefiting both individuals and the public. The particular areas of learning and their related benefits are listed in the outcomes taxonomy presented earlier. "Learning productivity" (the what-is-learned-for-how-much ratio), is included in this category rather than as a special subset of the *Productivity* domain (see below) because of its definitional links to outcomes.

Quality of Graduate and Professional Education contains a heterogeneous set of policy issues closely related to many of those under discussion for undergraduate education. These issues include matters of access, quality, productivity (particularly return on investment), financial support (both the adequacy of current funding and the distribution of funding between teaching and research), and workforce preparation and retraining. Other graduate or professional policy issues concern the payoff for the research being done, market demand for graduate training in some disciplines, and the payoff of graduate education to the individual student.

Workforce Preparation and Retraining. Preparation of the workforce (in some sectors, at least) has been a central mission of higher educational institutions since the founding of Harvard College, which was intended (among other things) to train physicians, clergy, and government leaders for the new colony. The importance of workforce preparation to the public good has been periodically reaffirmed since that time through a variety of legislative and Congressional actions. Calls for postsecondary education to be responsive to state and national needs have grown in recent years. They are unlikely to recede as the nation struggles to regain its international economic competitiveness and to reduce the national debt.

Workforce policy issues affecting postsecondary education in the U.S. are many, varied, and rapidly changing. Driven by a changing economy and emerging technologies, workforce supply and demand, employer expectations of (and satisfaction with) new and continuing employees, educational training programs and opportunities, equal access to employment, and economic development.

APPENDIX B

OTHER TAXONOMIES OF STUDENT OUTCOMES

A variety of student learning outcome taxonomies have been advanced. They range from those specific to a particular outcome domain, such as Bloom's (1956) taxonomy of cognitive outcomes to Chickering's (1969) seven "vectors" of students' psychosocial development (see also Chickering & Reisser, 1993). Any extended explication of available taxonomies is beyond the scope and purpose of this report, but it will be useful to examine some in order to appreciate the range of their complexity and inclusiveness. Doing so, it is hoped, will illuminate the possibilities from which one might choose in developing a state or national student learning outcomes data set.

Astin's Four-Fold Typology

Astin (1976, 1993) recognized that "There is no way to capture the impact of college adequately in one or two simple measures, such as credits and degrees earned or job placement" (1993, pp. 8-9). To guide variable selection for the Cooperative Institutional Research Program (CIRP) data collections, he developed the typology shown in the accompanying table. The framework is based on the type of outcome and the type of data to be gathered. Types of outcomes were categorized into "two broad domains: cognitive (sometimes called intellectual) and noncognitive (sometimes called affective)" (1993, p. 9). Types of data were similarly dichotomized into "psychological data, relating to the internal states or traits of the individual; and behavioral data, relating to directly observable activities" (1993, p. 9).

Astin's typology is perhaps the most parsimonious available. While the two "type" categories (cognitive and noncognitive) have been used for decades in the behavioral sciences, the reduction of types of outcomes to two domains offers little guidance for the selection of more specific outcome variables for use in the policy arena. Similarly, the "types of data" dimension has more utility for variable selection and data collection than for identification of specific outcomes. That dimension is, however, a useful reminder that student outcomes may be behavioral as well as psychological.

Ewell's Classification of Outcome Dimensions

Ewell (1984) has offered a taxonomy more detailed than Astin's. It contains four general categories of outcomes: knowledge, skills, attitudes and values, and relationships with society and particular constituencies. Each major domain has two or more subcategories which both help explain the content of a particular outcome domain and offer more specific examples of the classes of variables contained within each domain. The text accompanying the outline of Ewell's dimensions (pp. 31-44) provides additional examples of the content of each category.

Unlike Astin (1976, 1993), Ewell (1984) gives no attention in his typology to issues of the data to be collected or to the time dimension. His categories, however, provide substantially more detailed explication of the domains of student outcomes. For this reason, Ewell's framework has greater potential than Astin's for identifying and categorizing student outcome variables that might be useful in the policy arena.

The NCHEMS Outcomes Structure

The taxonomy developed by Lenning and his colleagues (Lenning, 1977; Lenning, Lee, Micek, & Service, 1977) for the National Center for Higher Education Management Systems (NCHEMS) is by far the most complex and inclusive. The NCHEMS structure was intended to "serve as a framework for organizing information in an effective way for purpose of classification, analysis, and decision-making" (Lenning, 1977, p. ix). It was designed not as a "student outcomes" taxonomy, but as a "framework that will accommodate information about the full range of postsecondary education outcomes" (Lenning, Lee, Micek, & Service, 1977, p. 1). Student outcomes comprise only a portion of the NCHEMS taxonomy.

The NCHEMS structure (figure) rests on three dimensions. The first is an *audience dimension* (a "first level of detail") that defines those individuals or groups who are touched in some way by postsecondary education outcomes. The dimension has five second-level categories: individuals/group clients; interest-based communities; geographic-based communities; aggregates of people (i.e., groups based on some distinguishing personal characteristic, such as ability, age, gender, race/ethnicity, socioeconomic status), and other audiences (e.g., the environment or populations of animals). The structure further defines 28 subcategories within the five major groups of the audience.

The second NCHEMS structural dimension, *type of outcome*, names and defines the nature of postsecondary outcomes. As with the audience dimensions, the type of outcome dimension is subdivided into five major outcome domains: economic, human characteristic (other than knowledge and understanding); knowledge, technology, and art form; resource and service provision, and other maintenance and change outcomes. These five major categories are themselves further subdivided into 24 second-level and 83 third-level subcategories. The similarities between Ewell's (1984) five-group classification and the NCHEMS structures first three second-level categories (excepting the technology and art form portions of the third category) are apparent.

A *time* dimension comprises the third portion of the NCHEMS structure and refers to the expected or actual occurrence of an outcome. This dimension was not subdivided because it was believed no set of categories would apply across audience groups. Lenning and his colleagues included because timing considerations are so important for planning and evaluation.

APPENDIX C

ELABORATION OF THE PROPOSED TAXONOMY OF STUDENT OUTCOMES

Communication and Computational Skills refers to the foundational skills students will need to function in the modern world and which will facilitate subsequent, self-directed learning. This domain includes skills in reading, oral and written expression, numeric calculations, and information acquisition, including the use of libraries, information technologies, and listening).

The **Higher-Order Cognitive and Intellectual Development** domain comprises a set of general intellectual and cognitive competencies and skills. These skills constitute more complex mental functions than those in the Communication and Computational Skills domain. These skills generally involve the effective processing and utilization of information and include such activities as critical thinking, problem-solving, the analysis and evaluation evidence or information, creative thinking, and both formal (e.g., Piagetian) and postformal reasoning (the analysis of problems for which there is no verifiably-correct answer, sometimes called "ill-structured" or "wicked" problems, such as crime, poverty, abortion). This category also includes moral reasoning, which refers to the *processes* by which judgments of right and wrong are made, not the contents of students beliefs about what is moral.

Content Learning refers to the subject matter knowledge students develop during their postsecondary educational experience. This domain has two general subcategories: The first is the "breadth" component of most undergraduate students curricular experiences. It consists of a general and broadly-based body of knowledge on which there is some consensus on what students should know. In traditional colleges and universities, students are exposed to this knowledge base through "general education" or "core" curricular experiences. What this "common" knowledge should be, of course, has been the subject of heated discussions in this country for nearly two centuries. The second, or "depth," category comprises the knowledge (and skills) needed to achieve a higher level of mastery and competence in a specific subject area. It is the content and competencies of the "academic major field." The relations of this category of content and skills to occupational or vocational preparation may be highly variable, depending on a students occupational goals.

The **Occupational Preparation** domain comprises the knowledge and skills students will need to obtain employment and function effectively in a specific vocation, occupation, or profession. The nature and effectiveness of the preparation for work students receive while in college have implications for career choice, occupational attainment, career progression and success, occupational mobility, job satisfaction, occupational status, and the transfer of that status advantages from one generation to another.

Workplace Skills refers to a more generalized set of personal characteristics and interpersonal competencies that people need to function effectively in most work settings. This category includes such personal traits as dependability and adaptability, as well as such interpersonal skills as the ability to work in groups and leadership skills.

Educational Success includes a set of outcomes having to do with educational aspirations and students' progression toward their education goals. It includes such variables as degree aspirations, persistence, time-to-degree, educational attainment (number of years of schooling completed or highest degree completed), and degree completion (completion of one or more certificate or degree programs).

Success in Transitions has to do with the extent to which one or more postsecondary education experiences equip students to move successfully (and with minimum difficulty) between educational and/or occupational settings, or to function in an educational and an occupational setting simultaneously. A transition may involve movement from education to employment, from employment to education, or from one educational setting to another (e.g., from an associate degree program to a baccalaureate program, or from an undergraduate program to graduate or professional school). This outcome has become increasingly important as postsecondary learning and retraining activities become more integrated. This outcome has been ignored in previous taxonomies.

Economic Benefits refers to the direct financial and related benefits that accrue to a student's postsecondary educational experience. Such benefits include income, the return on investment, standard of living, level of educationally-related financial indebtedness, and the ability to move geographically in order to obtain more remunerative employment.

Psychosocial Development comprises a range of personal dimensions that can be subdivided into two categories. The first involves "internal" changes in individuals' relations with themselves (the "psycho-" portion of "psychosocial"). The postsecondary experience has been shown to produce changes in an individual's "sense of self" in such areas as personal identity, self-concept, self-esteem, personal adjustment or maturity, and general psychological health (Pascarella & Terenzini, 1991). Psychosocial development may also involve changes in individuals' orientations to their "external" world (the "-social" portion of the adjective). The postsecondary experience might lead to changes in individuals' interpersonal skills, tolerance for people different from themselves and for ideas different from their own, or their intellectual curiosity (included in this category because it seems to be clearly neither an academic "content" nor a higher-order cognitive "skill"). In general, the facets of development covered by this domain tend to be relatively "central" to an individual's being, as well as enduring and slow to change.

While **Attitudes and Values** might be considered part of students psychosocial makeup, they are treated separately in this taxonomy because of the expanse of this domain and because one might reasonably argue that what one refers to as "attitudes" or "values" are more specific in nature and less resistant to change than the personal dimensions included under the "psychosocial" rubric. This domain comprises such outcomes as an appreciation of the visual and performing arts, occupational and educational values (e.g., the importance attached to intrinsic vs. extrinsic rewards), sociopolitical attitudes and values, religious orientation and values, interpersonal orientations (e.g., toward peoples of other races and cultures, gender, or sexual orientations), and standards of conduct.

Civic Development, one might reasonably argue, should be considered one dimension of students attitudes and values. As used here, however, the term refers to a set of specific, other-person-oriented behaviors, rather than to the more general dispositions or inclinations that are characteristics of one's attitudes and values. The outcomes listed above in those two domains may or may not be associated with actual behavior. "Civic development" refers to how one, in fact, behaves toward others, with strong overtones of community membership, participation, and responsibility.

The **Quality of Life** domain includes a variety of postsecondary education outcomes that are noneconomic in nature but nonetheless real. Such outcomes include a generalized "life satisfaction," health, marriage, child nurturance behaviors (e.g., in matters of health and education), consumer behaviors, savings and investment behaviors, and leisure time activities. Caution is in order, however, when attempting to refine and define these outcomes more precisely. While certain of these outcomes

(e.g., life satisfaction and health) probably cut across social classes and cultures in terms of their desirability, the value attached to other outcomes (e.g., smaller families, long-term perspective in investment strategies) may vary by social class or socioeconomic status.

APPENDIX D

ELABORATION OF THE CRITERIA FOR EVALUATING AN OUTCOME'S POLICY-RELEVANCE

First-Screen Criteria

Relevance deals with how closely an outcome is related to an important policy issue. “Relevance” reflects the strength of the conceptual linkage between an outcome variable and one or more policy issues. It addresses the appropriateness of the outcome for informing policy discussions. Consideration should also be given, however, to the “relevance” of an outcome for an institution's mission. Is the outcome consistent with what the institution says it is trying to accomplish?

Utility concerns the extent to which information on the outcome is likely to be useful for informing policy-making or for evaluating a particular policy that already exists. “Utility” refers to the potential of the information the outcome can provide for guiding action to achieve a policy objective. Utility may, of course, vary across user groups. The greater the number of user groups for whom an outcome is useful, the greater its utility.

Applicability refers to the extent to which the information to be collected meets the needs of multiple stakeholder/user groups. The various groups to be served include not only policy makers at various state or national levels, but also across sectors of postsecondary education and across levels or categories within any given sector.

Second-Screen Criteria

Interpretability refers to the clarity or conceptual complexity of the outcome. How readily understood is information on this outcome likely to be to various user groups? How well will information on the outcome “communicate” with multiple and diverse audiences (Ewell, 1994)? For example, information on specific economic outcomes such as employment, salary, or job status are likely to be readily understood by various audiences. In contrast, information on outcomes whose definitions are complex, slippery, or in dispute (e.g., cognitive development, creativity, or principled moral reasoning) may present interpretation problems for users.

Credibility reflects the degree of trust different stakeholder groups might be expected to place in information on an outcome. The term refers to the “face validity” of an outcome—the extent to which an outcome *appears* to measure what it is supposed to measure, although it may not actually do so. Credibility is, of course, rooted in the values and perceptions of the data users, and it will no doubt vary across stakeholder groups.

Fairness refers to what Ewell (1994) has called the “balance of perspective,” the extent to which the outcome “reflect(s) the perspectives and concerns of multiple constituents.” The important consideration is that use of an outcome not present biased or misleading information that serves to give one or more stakeholder or user groups an advantage over other groups.

Third-Screen Criteria

Scope has to do with whether “census” or “knowledge-base” type data are needed, whether data are needed from all institutions on all students (as in IPEDS) or from only a representative sample of institutions and/or students (as with High School and Beyond). Not all policy debates require census-type data, and collection of census data on some outcomes (e.g., cognitive gains) may well be a practical impossibility. Resolution of this consideration will have significant implications for data collection designs and costs.

Availability refers to the ease with which information on an outcome can be obtained. The concept has at least three dimensions. The first issue is the very *existence* of data on a desirable outcome (Does it exist at all?). The second dimension is the *accessibility* of the data. For example, students scores on a particular test may exist but access to them may be denied or restricted in some fashion (e.g., Graduate Record Examination scores). The third issue, *feasibility*, concerns the extent to which a “technology” already exists for measurement and data collection. Do instruments for data collection already exist? Have appropriate and workable data collection designs been developed? Is the hardware and software available for processing the data collected?

Measurability has multiple dimensions, most of which relate to the canons of measurement in the social sciences. The three most important issues, of course, are the operational definition to be adopted, the reliability alternative measures (the accuracy and consistency of measurement), and the validity of those measures (the extent to which a measure assesses what it is believed to assess). One additional facet of the validity of an outcome measure to be used in the policy arena is what Ewell (1994) has called its “vulnerability,” the extent to which the measure might be manipulated to suggest change that has not occurred in what the measure is believed to reflect. Measurability, however, also has a value-judgment dimension: What is the appropriate level of precision? Increased precision usually comes with a higher price tag, and as some point, decisions will have to be made about whether the increase in precision is worth the increased cost. This judgment must be made in light of the potential consequences of being wrong (i.e., of tolerating too much error in a measure): How much precision is required, given the policy issue, and (conversely) how much error can be tolerated?

Cost refers to the likely financial expenditures of collecting information on the variable being evaluated. Costs will originate with decisions concerning data collection design, size of the target sample or population, length of the data collection cycle (e.g., one-shot, periodic, annual), instrumentation (development and/or purchase), and staffing.

APPENDIX E

ISSUES FOR FUTURE CONSIDERATION

The charge to the Working Group was to define important student outcomes-related policy issues facing postsecondary education, to develop a framework for relating outcomes data to specific policy issues, and to assess approaches to developing data priorities from a policy perspective. As might be expected, the Group members and report reviewers raised a number of related issues. We have tried to address those that were clearly related to the Working Groups charge. Other issues, while not so directly relevant to the Groups business, are nonetheless important. They are described briefly here in the hopes that the issues will not be lost in subsequent discussions and activities as this project moves forward.

- a) **Appropriate Unit of Analysis.** The Working Group has focused its attention on outcome variables that might be measured with the student or institution as the unit of analysis. Certain policy issues, however, may require more aggregated, or "societal-level" outcomes information (e.g., the characteristics and distribution of individuals with particular workforce skills, general occupational or educational attainment levels for specific geographic or racial/ethnic groups). While societal-level statistics might be constructed from individual-level data, it will be important during the variable selection and subsequent data collection design processes to consider the specific data needs of the policy issues to be addressed and the appropriate unit of analysis for developing those data.
- b) **Importance of Inputs and Environmental Influences.** The Working Groups charge was to focus on student *outcomes*, but as Astin's Input-Environment-Outcome(I-E-O) Model makes clear (see Figure 1), outcomes are a function of the characteristics students bring with them to postsecondary education (the inputs) and of the characteristics of the institutions they attend and the kinds of experiences they have while there (the environments). As Ewell (report review) has pointed out, "most policy questions are in fact situated inside the causal arrows of the I-E-O model rather than lying within its domain-oriented boxes." Policy making seeks to shape behavior, and if educational outcomes are to be purposefully and positively shaped, information about the sources of influence on those outcomes (i.e., on inputs and environments) will be needed. Outcomes data collection development efforts should be coordinated with any future NPEC efforts relating to gathering information about relevant input and environment variables. These two sets of variables (and environments more so than inputs) constitute the major foci for policy intervention.
- c) **"Value-Added" and Status-Description Issues.** "Value-added" issues concern the extent to which students change as a consequence of their postsecondary education experience. Information on the nature and degree of such longitudinal change may be needed for certain policy decisions (e.g., whether to continue to invest in particular educational interventions or programs). Other policy questions, however, may require information that is more descriptive and cross-sectional (e.g., the distribution of particular skills in the workforce across segments of the population or in the population as a whole). Attention should be given to the distinctions between "growth" and "adequacy/capacity" measures and their intended use for informing policy.
- d) **Building on What We Know.** The process of selecting and building consensus on outcome variables need not start from scratch. The National Center for Education Statistics (1992, 1994,

1996) has sponsored two conferences which attempted to define the outcome domains for national data-collection purposes. Several reports by the National Center on Postsecondary Teaching, Learning, and Assessment (Jones, 1996, 1997; Jones, et al., 1994; Jones, Dougherty, Fantaske, & Hoffman, 1997) describe Delphi-based studies of the definitional consensus among faculty, administrators, and employers on the National Educational Goals of critical thinking, communication, and problem solving. Travers (1996) describes potential performance indicators in mathematics, and Adelman (1989) reports on similar efforts in computer science, mechanical engineering, biology, physics, and chemistry.

Similarly, much is known about the sources of influence on student outcomes (e.g., Pascarella & Terenzini, 1991). A useful next step might be to prepare brief, policy maker-oriented literature reviews of what we know about colleges influences on student change and development.

- e) **Variations in Information Needs According to Functional Responsibility and Level.** Information needs will vary with both the functional responsibility of the individual (e.g., administrator, trustee, legislator, staff member) and the organizational level at which the person serves (e.g., institution, state system, region, state or federal policy maker). The underlying question is "Who needs what and at what level of detail?" The Working Group was unable to address this question in the time available to it, but it is a matter that should be considered at some future stage as this project evolves.
- f) **Development of an Outcomes Performance "Index"?** Morgan Lewis (an outside reviewer) raised the question of developing a performance index for institutional, state, or national outcomes performance that would be analogous to the Dow-Jones Index, the Consumer Price Index, or similar indices (e.g., employment rates) for evaluating the health of the nation's economy. Such an index would consist of a limited number of "face-valid outcomes, especially for those with legislative responsibility" (review, p. 2). The Working Group did not consider such a possibility. It is included here (consistent with the title of this section) as one more "issue for future consideration."
- g) **Responsibility for Data Collection.** The Working Group was not charged with addressing a series of questions raised by one reviewer. They are fundamentally important questions, however, and are included here to "keep them on the table." At some future point, NPEC will have to come to grips with them: "Who will produce this information, for whom, to be used for what purpose? [If campuses are to be the producers,] Who will ask them [to] produce more, and by what authority, to what end, and with what trade-offs? In a national data-collection effort, whose responsibility will it be to turn that data into information?" (Margaret Miller).