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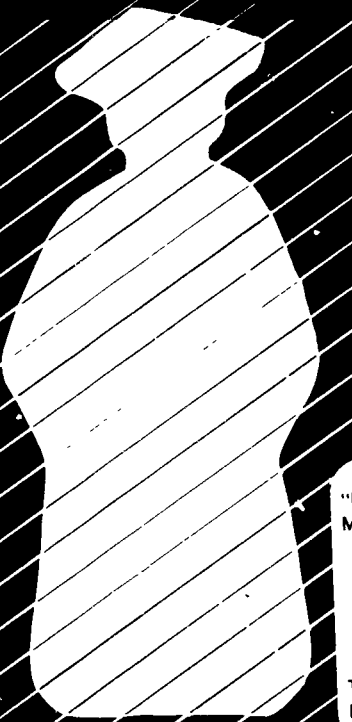
ABSTRACT

Research approaches to the complex issues related to college teaching and learning are discussed. Topics covered include: research itself (why improvement is needed, potential targets for improvement, types of research, and an integrated strategy for productive research); the learning activity; the teaching activity; learners; teachers; organization of postsecondary teaching and learning; and defining what is to be learned. Summary observations are offered that suggest complex interrelationships among mode of learning, method of teaching, learner attributes, teacher attributes, and organizational context. Recommendations are presented: (1) greater support should be provided for basic research, broader field testing, and improved translation for institutional researcher use; (2) institutional research offices should broaden their mission to include the translation and field testing functions; (3) policy researchers need to weigh more heavily basic studies and related field tests; and (4) both institutions and governmental agencies need to sponsor carefully structured evaluation research. (LB)



Approaches to Research on the Improvement of Postsecondary Teaching and Learning

A Working Paper

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Approaches to Research on the Improvement of Postsecondary Teaching and Learning

A Working Paper

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Introduction

The National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPTAL) is a research center funded from 1986-1990 by the Office of Educational Research and Improvement of the U.S. Department of Education. NCRIPTAL is focusing its research, development, and dissemination activities on five aspects of college environments that affect learner outcomes: (1) classroom learning and teaching strategies, (2) curricular structure and integration, (3) faculty attitudes and teaching behaviors, (4) organizational practices, and (5) the use of emerging information technology. In addition to its own research efforts, NCRIPTAL is charged with providing national leadership for other researchers concerned with the improvement of postsecondary teaching and learning. This leadership role includes

1. Encouraging discussion about needed research that extends beyond NCRIPTAL's immediate scope and budget,

2. Promoting the interchange of ideas among researchers, and,

3. Providing technical advice to institutions undertaking self-improvement efforts.

As appropriate to a recently established National Center, this paper aims at the first two of these three goals. Its purpose is to stimulate reflection about research approaches and to promote recognition of the complexity of the issues involved and the variety of approaches that might be taken.

I. Research to Improve Teaching and Learning

Why is Improvement Needed?

During the 1980s discussion about education has shifted from issues of access and equality toward a concern with realizing the potential for achievement among students at all levels of preparation and ability. Reports of declines in achievement among degree recipients, as measured by graduate and professional school entrance examinations, have followed earlier reports of insufficient preparation among entering college students. As a result, many public representatives, including governors and state legislators, believe that academic deficiencies of students who enter college with limited preparation have not been remedied by the time of graduation. Furthermore, even for students well-prepared for college, today's college experience is sometimes characterized as fragmented rather than coherent (Association of American Colleges, 1985), narrowing rather than broadening (Bennett, 1984), and vapid rather than engaging for students (NIE Study Group, 1984) As a result there is widespread discussion about the meaning of "excellence" in postsecondary education and the varied routes to its achievement.

In such a climate, both new research and new policies can assist in restoring credibility and accountability in collegiate education. Since the approaches employed by both researchers and policy-makers are determined by the issues addressed and the specific questions asked, it is essential to determine the assumptions concerning the sources of current problem areas in teaching and learning. For example, are the primary problems to be solved (1) in the activity of teaching or learning, (2) with the actors involved in teaching and learning, (3) in the organizations supporting the actors and processes, or perhaps, (4) in the definition of what is to be learned? If improvement is needed in each of these four areas, what research models are most likely to be useful? What current mechanisms are available to execute this research?

While making no claim to have identified all possible issues or approaches, in this paper we explore some of the underlying questions involved. First we describe several potential intervention points for improving teaching and learning. Second, we present a description of the types of research commonly employed to study these problems and inform improvement efforts. Third, we juxtapose the list of possible intervention points and the existing types of research to suggest that particular research agencies, typically employing different approaches, are best equipped to pursue various aspects of the problem. Finally, we suggest how the various research agencies might work together to inform and enhance each other's efforts.

Potential Targets for Improvement

One approach to the complex problem of improvement is to study the *activities* of teaching and learning. Learning and teaching can be viewed as distinct activities, each amenable to research and improvement. Another possibility is to view teaching and learning as mutually dependent, exploring how changes in one affect changes in the other. In either case, considerable effort is needed to better understand how formal education takes place and to use such knowledge to bring about improvement. To define and clarify productive learning processes or strategies and to describe more fully what constitutes effective teaching are important research agendas.

Another approach is to focus on the *actors* rather than on the activity. If postsecondary teaching and learning is not meeting public expectations, perhaps the problem is not in the process but in the characteristics of teachers and learners themselves. Student motivation, involvement, ability, and preparation all have an impact on the way in which students engage themselves in learning. Similarly, faculty preparation, motivation, and sense of task may shape the teaching-learning process.

An alternative formulation of the problem is that the organized delivery system for teaching and learning in postsecondary institutions is faulty. Teaching and learning are, in a crude sense, products of formal organizations which serve as societal gatekeepers to professions, occupations, and future lifestyles. It may be that research on improving teaching and learning should focus on the institutions society has created and their impact on both actors and activities.

Finally, the problem may be in lack of consensus of what is to be taught or learned. The definition of what is to be learned is a boundary issue between higher education and society. In some cases, administrator, faculty, students, and employers have different and not readily compatible views on what is important for students to learn. The problem of apparent lack of consensus

is exacerbated by long-standing neglect of ways to measure learning.

Types of Research

When considering possible problem areas, and consequently targets for intervention or improvement, we must also consider the types of research which might be used to investigate these topics. For the sake of discussion, we outline four interrelated types of research: basic research, institutional research, policy analysis, and evaluation. Although these research approaches are sometimes confused in public discussions, each is distinctive and will likely play a unique role in informing improvement efforts.

Basic research on teaching and learning typically is carried out by independent or collaborating researchers from fields such as psychology and education, although it is sometimes undertaken by various disciplinary groups or individual faculty members. The primary purpose of basic research is to better understand the processes of teaching and learning and the various influences on them. Since the ultimate goal of basic research is to discover causal relationships, the research methods chosen typically are exploratory, correlational, and experimental. The results of this research usually appear in scholarly journals, often without clearly stated implications for change.

Institutional research usually refers to studies directed and carried out by colleges attempting to understand and improve their own actors and activities. Most large colleges and universities maintain offices to conduct institutional studies and many small colleges conduct such studies on an *ad hoc* basis. For a variety of historical reasons, relatively little institutional research has focused on the teaching and learning processes or their outcomes and relatively few institutional research offices employ personnel whose primary interests are in these areas. Most studies conducted by institutional research units within colleges are descriptive or correlational, and since they are designed for local use, reports are not widely circulated.

Policy analysis may be considered research that examines and weighs alternative practices and strategies that one or more institutions might pursue The analysis may be carried out at many levels, for example, by institutional administrators, faculty or administrative committees, or by superordinate groups such as state coordinating agencies or legislatures. In its most complete form, the analysis will collate and draw on results from both basic and institutional research, suggesting how institutional practices must or might change in a desired direction Consequently, while policy analysis ultimately may be based on descriptive, correlational, or experimental information, it is a analytical technique which asserts that, based on the evidence, selected strategies may be most likely to produce certain desired results. Reports of policy research are often circulated widely but the sources on which they draw and the basis on which alternatives are chosen are not always made clear.

Evaluation is a specialized form of research that examines the results of existing strategies or policies to determine if intended or unintended outcomes actually can be attributed to them. As such, evaluation typically implies judgments about the success of various strategies and makes recommendations about their continuation. Evaluative research may be used to learn more about the effects of implementing strategies derived from the other types of research—basic esearch, institutional research, or policy analysis. The evaluation may be undertaken by independent researchers, by institutional research units, by other units within institutions, or by agencies with policy responsibilities. The methods used are often eclectic and frequently consider the values and interests of various stakeholders. The extent to which research reports are available and the extent to which they may be clear about their methods depends upon both the scope of responsibility and the public accountability of the sponsor.

Arguably, then, a successful program of research for improving teaching and learning must consider the potential contributions of all four types of research. Ideally, the policy analysts would weigh their decisions against knowledge produced by both basic and institutional researchers while the evaluative researcher would help to supply new and refined questions for both these groups and for policy analysts. This potential relationship, which currently does not operate ideally for many segments of higher education, is diagrammed in Figure 1.

An Integrated Strategy for Productive Research

The strengths and weakness of each type of research, as well as specific approaches, may influence both the nature and use of research. To facilitate consideration of the current status of research on postsecondary teaching and learning, we have created a matrix (Table 1) from the four primary types of research and the potential points of attack on the problem of improving teaching and learning that have been described. In the subsequent discussion, we assess research activities, trends, and roles at each of the intervention points.

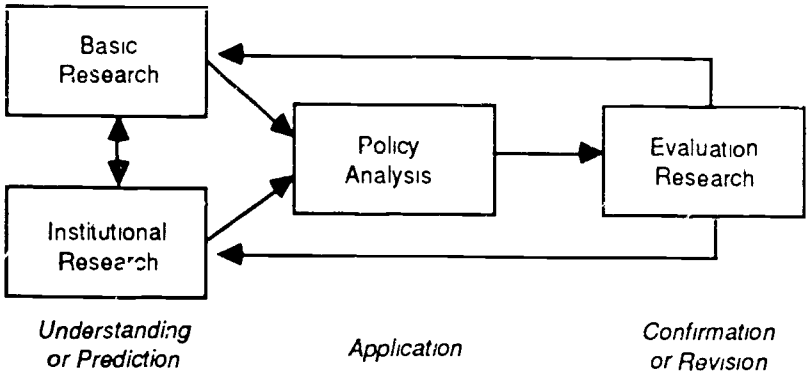

Figure 1. Ideal relationship among existing types of research.

TABLE 1
Locus of Research to Improve Teaching and Learning

INTERVENTION POINT	BASIC RESEARCH	INSTITUTIONAL RESEARCH	POLICY ANALYSIS	EVALUATION RESEARCH
1a. Activity: Learning				
1b Activity: Teaching				
2a Actors Learners				
2b Actors Teachers				
3 Organization				
4 Learning Content				

II. The Activity - Learning

If we are to improve learning, we must first understand what it is and how it takes place. Traditionally, the concept of learning as an activity has been intricately intertwined with the varied purposes of learning: personal development, social development, intellectual or cognitive development and development of skills for economic self-sufficiency. To achieve these purposes while in college, we typically expect students to acquire personal and social self-confidence and responsibility, to assimilate a body of knowledge, to gain appreciation for the shared meanings of a cultural heritage, to learn to think critically and engage in reasoned discourse, and often to develop marketable skills. Lack of consensus about priority among these goals and occasionally the assignment of responsibility for them to different divisions of educational institutions has obscured the commonality among them—namely, that all involve changes in the learners' ways of thinking and behaving.

Current basic research on learning, however, attempts to define and conceptualize across types of learning, the processes by which individuals amass information and compare, sort, evaluate, and apply this information in appropriate or novel ways. These processes are believed to occur whether the learner is engaging in a new vocational experience, a new personal/social experience, or an experience desired to foster intellectual growth. Three approaches within the field of cognitive psychology are directly relevant to educational research: cognitive processing models, cognitive developmental stage models, and experimental models of motivation and cognition.

The key factors in an information-processing model of student learning—cognitive factors, problem-solving abilities, knowledge representation and learning strategies—may be mediated by motivational factors such as student anxiety and attributional styles (McKeachie, et al., 1986). Currently, many researchers believe that the cognitive factors can be altered through instruction, thus, students can learn to learn. The key question is how to help them do so.

Another concept within cognitive psychology is the idea that intellectual development proceeds in stages. Recent work by Case (1985) continues the tradition pioneered by Piaget. "Vectors" of cognitive development are hierarchically structured with each based on thorough assimilation of the previous. In higher education, Perry has suggested a similar framework although with different elements (1970). In such a research tradition, the questions become identifying and facilitating movement from one stage of intellectual development to another.

Within cognitive psychology, there is also a growing body of literature that attempts to establish the relationship between affect and cognition. Zajonc (1980) has suggested that "pure" cognition may not exist. In this view the storage and retrieval capabilities of the mind are based on affective factors, not abstract knowledge structures. Thus, when asked about a book or issue, a person will first reply with how he or she felt about it and only then will be able to recall more specific content. In this paradigm, all knowledge is stored with affective "tags". Application of this model to educational research would lead us to explore the affective components of the learning situation to understand how information learned would be triggered and used in future settings. Such explorations have broad implications for involving students in their learning experiences as well as for developing continued motivation to undertake new learning.

A different but also promising area of research on learning stems from research on the functioning of the human brain. Ongoing studies of the role and pathways of neurotransmitters may aid us in distinguishing and categorizing modes of thinking and learning. Are the patterns of brain activity the same when constructing an algorithm for a computer program as when analyzing the structure of a Mozart symphony? Such an approach is obviously quite different from traditional categorizations of learning that are related to societal purposes.

Clearly, models such as these, which seek to understand the nature of learning, lie within the realm of basic research, typically in psychology or neuroscience. The exploration of these ideas is slow and painstaking and is undertaken by specialized researchers. Little work is done by college institutional research offices on basic learning strategies or student learning patterns. Policy makers find the emerging research difficult to assess and understand. Thus, application and field testing are slow to develop.

One application of the cognitive psychology models is to use emerging knowledge of the ways in which people think and learn to structure and sequence material for learning. The concept of "mastery learning" can be seen as such an application. It is premised on the notion that there is a hierarchy of concepts, or that related concepts can be sequenced so as to expedite information

processing, thus minimizing individual student differences in ability to organize and remember information.

A related approach is to use knowledge about learning to effect change in the individual students. The possibility exists that students can be exposed to these principles and processes and thereby be taught how to learn.

One advantage to conceptualizing learning as a distinct activity is that derived principles may be tested outside the classroom. The growing importance of information technology on the campus offers an opportunity to explore in detail the intersection between the substantive content to be learned and the formal thought structures requisite to the learning tasks. Future research on learning will undoubtedly be informed and altered by current research in information technology and artificial intelligence. Although we may be moving closer to understanding how humans process and represent information, we are still a long way from understanding how understanding is achieved.

Occasionally an idea from basic research emerges into public view and is adopted as a panacea, usually with considerable disappointment. In cases where policy analysis has been based on basic research findings, decisions are generally made to incorporate one of the basic application ideas, such as mastery learning, in a large scale way on a given campus. Evaluation research may then become difficult or impossible because of the absence of comparable learning experiences in other modes. Alternatively, policies may be made to apply certain treatments, such as those to teach learning strategies, to students with particular deficiencies. In such cases, the special selection of target groups and the absence of randomized control groups has hampered the feedback from application settings and has limited field testing of developments emerging from basic research. Finally, because colleges and universities have focused on cognitive development for young adults who simultaneously are establishing their personal and social identities, the application of learning principles to development of adults and those seeking economic self- sufficiency has remained underdeveloped. Despite such underdevelopment of basic research, speculative policies and evaluative research concerning vocational learning abound in order to meet societal changes that have not yet been fully recognized by researchers. In such a case, evaluative research may precede and drive basic research rather than the reverse.

III. The Activity - Teaching

If we are dissatisfied with student learning in colleges, one source of the problem might be that we do not know what constitutes effective teaching or how to ensure that it takes place. The process of teaching is difficult to study as an abstraction. While it is easy to imagine someone learning without a teacher present, it is hard to imagine teaching without reference to learning. Thus, while learning may be studied as a process in its own right, teaching either formally or informally involves a learner.

One place to begin research on teaching is to define major dimensions of the task. At least four dimensions might be considered: (1) transmitting knowledge; (2) motivating students to learn; (3) selecting and organizing facts, concepts, principles, skills and attitudes to be introduced; and (4) serving as a formal or informal role model for students.

Most of the existing research has focused on the first dimension, evaluating the effectiveness of various instructional modes (e.g., lecture, discussion, directed experience, etc.). Results of this research suggest that "effectiveness" can best be evaluated with reference to instructional objectives. Since each mode achieves different objectives, no single mode can be cited as clearly superior.

The ability of various teaching strategies to motivate student learning has been the subject of much debate. Recently both policy groups and researchers have urged the adoption of teaching strategies that promote "active" rather than "passive" learning (NIE, 1984; Astin, 1985). The assumption behind this perspective is that teaching should encourage appreciation of the substantive content and promote the development of student curiosity that might facilitate further inquiry. In short, teachers are seen as evangelists for learning and not mere presenters of encyclopedic knowledge. A difficulty with this view is that there is little information about the extent to which teaching can be seen as missionary when the diversity of student goals and purposes is left unexamined. Indeed, it may be in this area of student motivation and effort rather than in teaching or learning strategies where the purposefulness of education for the student is essential to the success of teaching.

The third dimension of teaching, the organization and sequencing of the information presented in college classrooms, has received little systematic attention. What elements do faculty members consider when structuring a course? What influences their decisions? Considerable work on teacher thought processes both when planning and directing learning has been begun by K-12 school researchers in the last several years but little such research has been done at the college level (Stark & Lowther, 1986). Rather, it is merely assumed that college teachers "teach as they were taught" and that little can be done about engaging their consideration of alternatives. Yet we do know that students who evaluate teaching consider teachers who appear well-prepared and well-organized as effective.

The fourth dimension, the teacher as role model, has been almost totally ignored except for a scattered studies of "mentoring" that typically involve relationships at the post-baccalaureate level. Yet, anecdotal evidence indicates that the "great teacher" influence is not a myth. Further, a great deal of research holds that interaction between faculty and students differentiates between students who stay in college and those who leave, between those who are satisfied with the college experience and those who are disgruntled. Seemingly, the task of serving as a role model is closely related to the task of becoming a motivator of students. The lack of distinction between these two tasks, as well as lack of recognition that teaching may be both formal and informal, may account for the neglect of this dimension.

In contrast to research on learning, the majority of research on postsecondary teaching has been of an applied, rather than basic, nature. Superficially, at least, the act of teaching is more directly observable than the act of learning. Thus, institutional research efforts frequently include descriptions of teaching in a given institution. Such descriptions typically are limited, however, to the demography of the instructional scene— number of courses, size of classes, mode of instruction. The teaching process itself has been considered private and not open to investigation. If basic psychological or sociological underpinnings of teacher thought processes exist, as they surely must, they have not yet been identified nor have they become the province of any discipline for basic research. Perhaps as a consequence, policy analysts have felt somewhat more free to formulate recommendations based on the limited applied research in this area than is the case for complex basic research on learning. Once policy decisions have been formulated, evaluation is seldom undertaken.

IV. The Actors - Learners

When trying to understand difficulties in the teaching-learning process, one obvious question to ask is "Who are the learners?". In truth, the bulk of our understanding of teaching and learning stems from research on individual students. While this research covers a vast spectrum of discrete topics, research on individual learners might be classified as following two distinct approaches. The first approach, often using large-scale survey data, attempts to describe successful learners and identify the correlates of that success. The second is concerned with understanding student learning in relation to student identity, placing the learning experience in the context of students' past abilities and perceived futures.

What is it about some students that allows them to succeed at the tasks society defines for them? Surveys, analyses of achievement test scores, and case studies have been used to try to identify what makes a successful learner. Implicit in this approach is the notion that if we understand the characteristics that breed success, we can promote the development of these characteristics. This notion is challenged by some; for example, Cross (1986) points out that many of the characteristics thus identified are not variables within the purview of the college to change. Nonetheless, many major cross sectional surveys of college students have attempted to isolate the affective and behavioral correlates of academic success as well as the sociological correlates.

One major example of this type of work is the research conducted on the CIRP data and reported by Astin (1979). Astin found that involvement in campus activities, part-time campus employment, and on-campus residence are a few of the variables positively related to academic achievement. In a subsequent work, Astin concludes that "involvement" in college life is the key component which distinguishes successful students from those less academically successful (1985). Similar approaches are taken by Pace (1979), who concludes from his own studies and others' that students learn what they study and grow proportionately to the efforts they exert. Finally, in examining predictors of student success in nine colleges, Willingham (1985) concluded that a personal quality he called "productivity," seemingly undergirded by personal energy and perseverance, is a key factor in college success.

One advantage of identifying characteristics of learner success is that it provides concrete information on a larger number of persons than would be possible through mere observation. Another advantage is that it is amenable to use by colleges and can thus take into account their unique missions, characteristics, and student clienteles. A disadvantage is that the personal and social context of the process of learning is excluded when the student is one case in a survey. While surveys suggest important areas of concern, and sometimes imply interventions, they do not offer much information on the dynamics and context of such appealing constructs as "involvement," "quality of effort," or "productivity" to be useful in advocating concrete strategies for intervention with particular types of students.

A modification to the search for universal characteristics is to identify individual differences among learners. By recognizing special populations, researchers can begin to specify models of achievement and learning across subgroups and examine the meaning of these differences in relation to student success. This approach is, at least in part, congruent with issues in the information-processing view of learning that sees learning as the integration of new knowledge with that already possessed. Again, using an earlier example, the notions of student involvement and productivity may be quite different for younger than for older students, for minority than for majority students, and for vocationally oriented students than for socially oriented students. Examination of these subgroups can lead toward a making such constructs more concrete. Many such studies are underway both as subsidiaries of large surveys and within individual colleges.

A related line of inquiry that is not pursued as actively is the study of student cohorts in the broader historical context of the real or perceived constraints and opportunities of the employment market. The meaning and purpose of college for students, generally or by subgroups, may be very different in different economic eras. Longitudinal studies have not been used extensively to examine the societal constraints on student learning experiences.

A far different perspective on individual learners is gained by questioning the meaning of learning in the context of students' own lives. Instead of asking "Who are the learners?" the question becomes "What is the meaning of learning for the students?". This type of questioning is

exemplified by research ranging from Chickering's synthesis in *Education and Identity* (1969) to Perry's compendium of observations in *Intellectual and Ethical Development of College Students* (1970) and, more recently, *Careerism and Intellectualism Among College Students* (1985), a study of college student goals and purposes at a single university. In this approach college learning is seen as an event in an individual's life history. Not only the students' socioeconomic or demographic characteristics but their motivations, feelings of self-efficacy, expectations of success, and attributions are viewed as critical determinants of the learning experience.

An interesting question suggested by this perspective is "To what extent do (can) students develop self-identities as learners?" Researchers in social psychology recently have been engaged in studies to define and measure individual "schemata", or cognitive generalizations about the self, for various social roles (Markus, 1977). Application of this type of research might aid in understanding the extent to which students incorporate a sense of their ability to learn into their larger identity and the impact of such incorporation on learning outcomes.

Survey research of an ex post facto or longitudinal nature has usually been conducted by those who see themselves as basic researchers engaged in descriptive and correlational studies. Less frequently, and possibly with less sophistication, survey research has also been conducted by on-campus institutional research offices. In either case, policy analysis drawing on such findings has just begun to emerge. For example, the national report *Involvement in Learning* (NIE Study Group, 1984) may be viewed as policy research drawing upon more basic local and national studies. The study of student characteristics and the derivation of policy implications has developed to the stage where evaluation research will be needed to confirm or revise these notions in light of intervention strategies they suggest. An important element of the success of such research is examination of the extent to which appropriate and substantiated interventions can be undertaken for particular subgroups of students and subsequently assessed.

In contrast, exploration of the meaning of education for students is seldom undertaken by institutional researchers. Such studies are most frequently driven by desire for deeper understanding of human experience. Their time-consuming and expensive execution is limited to basic researchers in the social and behavioral sciences. While such research seldom attracts the attention of policy analysts, on those occasions when it does, a humanistic, anecdotal presentation mode may provide considerable appeal. Because of the individualistic and ethnographic nature of these basic investigations, evaluative research is infrequently conducted.

V. The Actors - Teachers

For most questions one may ask about learners, a parallel question may be asked about teachers. What differentiates the successful teacher from those less successful? What is the meaning of teaching for teachers? What promotes their "involvement," "quality of effort," or "productivity"?

Although demographic descriptions of the college faculty abound, efforts to determine which faculty are successful teachers are limited by the lack of consensus on criteria to be used. In the sense that masses of correlational data exist within institutional files, evaluative studies of teaching by students parallel quite closely the massive surveys of students by educational researchers. The rather consistent factors emerging from student evaluations reveal what students like in teachers. However, these surveys do not inform us about which attributes and skills of teachers are important in determining student performance.

Studying the meaning of teaching to faculty might be a somewhat easier task since the context for the research is the teacher's own work rather than the group of students taught. A wide variety of studies have elicited faculty attitudes on many social and political questions. Such studies help to understand something of the life and views of various groups of faculty, divided by discipline and institutional type as well as by demographic characteristics. Nonetheless, as pointed out by Blackburn (1986), studies that probe the attitudes of faculty toward the teaching role are scarce. Once a start has been made in acquiring a basic view, longitudinal studies will be needed. This is true because, as is the case for students, changes of emphasis in the multiple roles faculty perform and the historical or economic context of the times may result in different meanings of teaching for different cohorts.

Considerably more information is available regarding a few factors that influence teachers to be involved and productive. Studies of morale, productivity, job satisfaction, and time use, however, typically have been conducted without comparisons with other professional occupations. Finally, of course, because there are virtually no studies of the meaning of teaching, knowledge about job-related variables must be interpreted without the necessary context.

In summary, the substantial basic research on the psychology of work in other fields has not been extended to the somewhat unique role of the college teacher. Instead, basic researchers collect attitudinal data from faculty about political and social issues while institutional research offices collect work-related demographics. Policy researchers at colleges, like those in broader settings, have little meaningful information on which to draw but show increased receptivity to surveys that lack perspectives that might be gained from basic understanding of the human being as teacher. In such a situation, planned interventions to improve college teaching and learning focused on the teacher as actor may be inappropriate. In the absence of criteria or due to the politicization of criterion research by stakeholders, evaluation research languishes.

VI. The Organization of Postsecondary Teaching and Learning

The quality of formal education depends on the organizations that support teaching and learning. If we seek ways to improve learning, it is reasonable to scrutinize the institutions that foster student learning as a primary goal. How do these institutions promote or hinder student success?

Through both observation and logical analysis, researchers have examined institutional functions and goals. To illustrate, from a sociological perspective, an early formulation of the educational system included three major functions: instruction, cultural socialization, and selection (Parsons, 1959). Bowen, an economist/educator, recognized three broad societal services provided by higher education: instruction, research and scholarship, and public service (1974). Finally, from an eclectic stance, researchers have developed a detailed taxonomy of potential higher education outcomes with five major categories: economic outcomes; human characteristic outcomes; knowledge, technology, and art form outcomes; resource and service provision outcomes; other maintenance and change outcomes (Lenning, Lee, Micek, & Service, 1977). Perhaps an additional and commonly overlooked goal must be added, that of institutional self-survival. Regardless of the classification system used, the tensions among these multiple goals and functions of higher education and the relative resources allocated to them are critical factors in all aspects of institutional performance. As a result of these tensions, studies of colleges and universities as organizations have been frequent but varied in approach.

One approach to studying the question is to develop criteria for judging the organizational effectiveness of postsecondary institutions in relation to one or more of the multiple goals. This type of analysis, however, is hindered by the fact that basic research developed in other types of organizations is often inappropriate to higher education. Although used by some state agencies, profit margins, market share and similar concepts used to measure commercial and industrial success have few direct analogues in education. Other concepts developed to evaluate patron-client relationships (reputation, referrals, client accountability, client surveys) have been used by institutions or by external agencies, but the considerable suspicion these methods engender limit their utility. The residue of the various research strategies is a persistent question: "To whom is the college accountable: the student, the funding sources, or the broader society—or all of these?"

A relatively recent approach to this problem is to examine institutional culture or climate. One such line of research, most often conducted by institutional researchers, has compared the perceptions of constituent campus groups with respect to institutional functioning or goal achievement. To the extent that there is a shared vision of organizational mission, whether a vision of diverse opportunity demanding student and faculty initiative or a vision of common values and purposes, the college is seen as effective. This notion is reinforced among the public by research defining effective public schools as sharing norms of human concern and task orientation under strong leadership.

Despite the diverse approaches to characterizing organizational effectiveness, there has been little attempt in higher education to link the various dimensions of this concept directly to teaching and learning (Peterson, 1986). Some believe such direct links are impossible to ascertain, except perhaps when examining small institutional sub-units or specific academic practices. Thus, current approaches proceed by examining the influence that organizational characteristics exert indirectly through one or more mediators, e.g., students, faculty, specific teaching and learning practices, curriculum development, or accountability mechanisms.

Simultaneously, basic researchers are attempting to understand the characteristics of colleges as organizations while institutional researchers collect data to facilitate interinstitutional comparisons. Occasionally, institutional researchers consider possible links between organizational functioning and student learning, particularly as portrayed in measures of alumni satisfaction. The primary impetus for research, however, is being generated by policy researchers in response to public views that the links are strong. Furthermore, as statewide "megasystems" of universities emerge, the potential for new and broader (rather than narrower) definitions of educational organizations increase. Despite the intuitive appeal of organizational change as the vehicle for improving teaching and learning, the development of research models to test this potential relationship lies in the future. Replicable research at the institutional level is needed to pinpoint what aspects of organizational change are effective in improving what aspects of teaching and learning.

VII. Defining What is to be Learned

A focus on what is to be learned in college returns this analysis to a point closely related to our original discussion of learning as a process. While the public continues to ask what has caused declines in standardized test scores, researchers may well ask about the validity of the measures. Perhaps declining scores are not indicative of a true decline in student learning. Rather, in a rapidly changing society, the shifts in scores may suggest that we are not measuring what it is that students actually do learn. Some policy researchers have proposed that one way in which teaching and learning might be improved is to articulate more clearly what students should learn in colleges and universities and then develop valid measures of that learning (NIE Study Group, 1984). As this strategy is contemplated, at least five questions must be addressed: What should students learn? Who should decide? Should all students learn the same things? How should we measure what has been learned? What is measurement likely to tell us about what interventions will improve learning?

Although lists of desirable learning outcomes are seldom short, taking a broad view there are three primary competitors for the slot "most important to be learned": (1) conceptual and factual knowledge; (2) critical thinking and problem-solving skills; and (3) professional or career skills. For some, the most serious problem with higher education is exemplified by the student with abundant technical knowledge but who may not be well versed in humanities; for others it is the student who cannot analyze new material independently, and for still others it is the student who has no obvious "marketable" skills. The question of what students should learn and who should decide becomes a research question only after one accepts one of several prior premises. To cite only four of a potentially much larger set of such premises: (1) what should be learned is a societal issue and in a democratic society the majority should decide; (2) what should be learned is a societal issue but the long range societal welfare demands that neutral and knowledgeable experts, rather than the general majority, should decide; (3) what should be learned is an economic issue and the employment marketplace should be allowed to determine what students choose; (4) what should be learned is an matter of individual choice and benefit. Clearly, as long as educators and the public approach what should be learned from these differing perspectives, the questions of what should be learned or who should decide are outside the arena of educational research.

Setting difficulties in resolving the varying perspectives aside, the implications for teaching and learning of the chosen priorities for learning are far-reaching. If facts and concepts are important, curriculum research should be aimed at designing courses and programs so as to make the information presented easy for students to grasp and assimilate. If critical thinking is the major objective, courses and researchers should investigate how topics may be chosen and organized so that these skills are purposefully developed and practiced. If marketable skills are important, the implications for teaching may include both of these considerations as well as continual analysis of a changing employment needs in a rapidly changing economic and technological world. Beyond these questions of strategy in choosing learning content, important research questions that emerge in such a volatile setting include considerations of whether any one of the goals automatically excludes the others. Finally, to what extent can the three areas (and others, such as communication skills, value development, and aesthetic appreciation) be mutually interdependent and reinforcing?

Perennial discussion about what should be learned has tended to suppress research about various teaching and learning strategies and has, on occasion, politicized controlled curricular experimentation. As a consequence of this knowledge gap in college curriculum development, decisions about what is to be learned are influenced and made at several levels: by federal and state funding initiatives or regulations, by employers, by accreditors, by college programs, by families and, on a daily basis, by individual students, faculty members, and administrators. Even within the same college program some administrators and faculty members may advocate a broad variety of learning experiences while others espouse study of one area in considerable depth or a particular type of teaching system. Students, in turn, may disengage from this conflict and consider minimal demands or the future applicability of learning as primary. Recognition of differing purposes, articulation of varied aims at each level of decision-making, principles of classroom autonomy, and a strong belief in individual choice have hampered basic research about what students study and learn.

Basic research assessing what students learn tells us that students who have taken

particular college subjects know more about those subjects than students who have not studied them. Emerging basic and institutional research focusing on student-course-taking patterns should tell us what courses students are selecting or avoiding. Extrapolation of the "theory of involvement" discussed earlier leads us to believe that students will learn more thoroughly what they see as interesting, engaging, useful, or attainable. Currently, policy researchers who are weighing methods to improve teaching and learning have focused on these related propositions and suggest the collection of student outcome measures. If so construed, such data collection may be seen as evaluative research to confirm or deny these caveats. Models for research concerning what students can and should learn under given circumstances are needed to link emerging information back to improve the processes of teaching and learning.

VIII. Summary

Proceeding from our own sense of the status quo rather than from any empirical summary of ongoing research, we observed the following:

1. Basic research on college student learning is advancing rapidly through progress in cognitive psychology. At present, these findings are not frequently field tested or translated into practice. Better understanding of the learning process is not an important focus for other types of research.

2. The entire field of research on college teaching is underdeveloped. While attempted improvements in practice proceed by trial and error in scattered settings, little basic knowledge about the process of teaching is available to inform us about the potential impact of intervention through changes in the way teachers teach.

3. An abundant literature on student characteristics describes the ways in which students change during college, and the correlates of student success, at least as defined externally to the student. This descriptive and correlational research has reached a stage of development where colleges can readily collect and analyze their own data for policy analysis or for program evaluation. Only recently, however, has basic research been launched to explore the meaning of education to the student. Such studies, closely allied to developing psychological paradigms and ethnographic research methods, are expensive and rare.

4. Demographic and attitudinal descriptions of faculty members abound. Compared to the parallel database on students, this research lacks longitudinal studies and correlational studies involving variables directly concerned with the person as teacher. Without noting the superficiality of research on faculty, policy researchers call on it for propositions that modify the context in which the faculty member performs the teaching role.

5. Within the substantial amount of literature on organizations, colleges and universities have received their share of attention by both basic and institutional researchers. Within this research base, the connections between student learning and varied measures of organizational effectiveness have not been effectively explored. New models are needed for research at all levels, particularly since some researchers advocate seeking meaning through the examination of institutional subcultures while policy initiatives increasingly move to a broader systemwide or statewide context.

6. Partly because consensus is lacking about what students should learn, partly because of beliefs in individual choice, and partly because research has been politicized, there are few models to test the impact of the differences between what students are supposed to learn and what they do learn under varied circumstances. In this arena, keen interest among policy and evaluation researchers may stimulate more basic investigations.

As a heuristic device, we separated each of four ways of approaching the task of improving teaching and learning and each of four types of research that might provide enlightenment. It quickly became obvious that each juncture at which teaching and learning might be improved is inextricably related to the others. One of the benefits of examining each as a discrete issue is that we are then able to see the relationships more clearly. For example, it became obvious in our discussion that the purposes for which students attend college (personal, social, cognitive, and vocational development) not only affect their learning but permeate societal debate about what they should learn. Similarly, it was difficult to talk of teaching without envisioning the learner.

Because of these interrelationships, the research models used to investigate these issues are necessarily complex. Student outcomes are not the function of a single additive process: mode of learning + method of teaching + learner attributes + teacher attributes + organizational context = learning achievements. Any attempts to estimate such an equation would be foolhardy. Instead the models used for advancing knowledge must reflect the complexity of the questions, recognizing both the interactions between elements and the existence of multiple points for intervention. Nor can it be assumed that interventions, such as those that might be recommended by policy researchers, are independent; their effects will be evident in several aspects of teaching and learning.

While these relationships between teacher and learner, teaching and learning, goals and outcomes are commonly recognized, the connections between the types of research we have described are not so obvious. If, as some assert, educational research has little impact on practice, the reason may be that links among the various types of research, often undertaken by diverse agencies for varying purposes, are weak or nonexistent. Earlier, in Figure 1, we diagrammed an ideal model in which each type of research would reciprocally inform the other types. Here we set forth some recommendations about how the reality of this situation could be brought closer to the ideal.

1. Basic research that holds promise of improving college teaching and learning needs greater support, broader field testing, and improved translation for the use of institutional researchers. It is no secret that much of this research originated as psychologists explored various aspects of personality and cognition with the handiest subjects, college students. Colleges themselves have never invested heavily in the research and development enterprise deliberately to improve teaching. Societal interest, as well as institutional self-interest, makes this a propitious time to foster greater amounts of such research.

2. Institutional research, a little publicized aspect of university operation, typically has focused on aspects of organization most closely allied to funding, facilities and enrollment planning, systems operations, and report generating. In relatively few universities are personnel in the institutional research office either appropriately trained or inclined to apply basic research to the improvement of teaching and learning. In some universities, a separate office of faculty instructional development also exists. In these offices too, neither the origin of the developmental activity nor current expectations are likely to foster research directly concerned with teaching and learning. It is time for these offices to broaden their mission to include the translation and field testing functions as well as the training of faculty members to be classroom researchers (as suggested by Cross, 1986).

3. Policy researchers need to weigh more heavily basic studies and related field tests, recognizing that simplistic alternatives based on superficial understanding are unlikely to provide long-range improvements. Even so, if the necessary developmental mechanisms for basic research and institutional field-testing do not exist, policy researchers can hardly be blamed for choosing among available studies that are understandable and seem promising.

4. Lastly, despite objections on the grounds of intrusion, both institutions and governmental agencies need to sponsor carefully structured evaluation research. Traditionally, universities have relied on sporadic efforts of a politicized committee system to collect descriptive data about teaching and learning and develop recommended changes. The evaluation research office within a university should have dual obligations: to examine the results of chosen policy alternatives and to identify areas of need for new basic and institutional research. Such an office would complete the link in a systematic research enterprise that would at least come close to approaching the complexity of the problems by which it is challenged.

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