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AUTHOR Yudof, Mark G.; And Others
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ABSTRACT

Research recommendations on policy issues that have national scope and significance and that are appropriate for research and development centers supported by the National Institute of Education (NIE) are offered to the director of NIE. Five mission statements are presented for the following areas: policy and pupil performance, policy and school personnel, policy on education and employment, governance and educational policy, and translating research into educational improvement. The mission statements include information on the following: the nature of the problem and its probable short- or long-term duration, the type of research that is indicated for each mission, potential research topics and themes, research agendas, audiences and consumers for the center's research and development; challenges for policymakers over the next decade, new research that will be needed over the next decade, resources and institutions that will be necessary to do the research, issues pertaining to different levels of government, and public-private issues. Organizational concerns pertaining to the centers are also briefly discussed. In addition, two papers on technology and education are appended: "The Transfer of Knowledge," by the Study Group for Educational Policy, and "Why Will the Computer Become the Dominant Educational Delivery System?" by Alfred Bork. (SW)

RECOMMENDATIONS OF CENTER STUDY GROUP

FOR

EDUCATIONAL POLICY

SUBMITTED TO:

Dr. Manuel Justiz, Director
National Institute of Education

October 3, 1983

October 3, 1983

Dr. Manuel J. Justiz, Director
National Institute of Education
Washington, D.C.

Dear Dr. Justiz:

I am pleased, as Chairman of the Center Study Group for Educational Policy, to transmit to you our final report, as unanimously endorsed by the 10 members of the Group.

The Study Group believes that it has fulfilled the requirements that you outlined in your charge and in your opening comments to the Group in August. Certainly, all members would have desired more time to polish our final report, but we are confident in regard to the substance.

As Chairman, I do request that you pay particular attention to the Introduction. It states our belief in the importance of the initiative upon which you and the National Institute of Education have embarked.

Any prolonged delay in the announced Lab and Center competition may have severe and lasting adverse consequences for the ability of the Institute to support timely and necessary research initiatives as described in our mission statements and those of the other Study Groups.

We thank you for the opportunity to be of service and we look forward to the successful implementation of the Plan of Action.

Sincerely,

Mark G. Yudof
Chairman
Center Study Group for
Educational Policy

Introduction

"History is not kind to idlers." With these words, the National Commission on Excellence in Education described the educational policy dilemma facing the nation. The central problem is the improvement of student performance in our schools.

The National Institute of Education is the major educational research arm of the Federal government. It is essential that the Institute revise the current directions of its research laboratories and centers, and stimulate new activities that concentrate upon the quality of education:

> All, regardless of race or class or economic status are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children...can hope to attain the mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself. (National Commission on Excellence in Education)

This is not a time for complacency. NIE must be on the cutting edge of research that identifies policies that will be supportive of the techniques, technology, educational climate, and school personnel needed to accomplish this objective. Educational policy, finance, and governance decisions will either stifle or drive the quest for improved student performance. The choice is ours.

The Congress, the Department of Education, and the Institute have chosen to open up the funding process for education labs and centers to a free competition for scarce national resources. We applaud this bold step.

-- a well-publicized and open competition will bring forth a new era of national creativity, an opportunity that might well be missed if a "business as usual" attitude were taken;

-- NIE must consider new cooperative alliances in the public and private sectors as it establishes a research agenda responsive to its statutory directives and to the education concerns of the nation;

-- NIE must address the declining confidence in education and present findings that promise to promote educational improvement;

-- the findings need to be responsive to and usable by practitioners in the trenches, those responsible for the day-to-day operation of education institutions.

NIE must be a part of the solution to the problems of student performance and public alarm about the quality of American education. It must do a number of things:

-- Its research agenda should include the enduring and critical issues raised by recent reports on the state of education in America;

-- NIE must take the initiative in exploring new options and alternatives for bringing the benefits of education to all--old and young, affluent and poor, majority and minority;

-- NIE must overcome the traditional insularity of education research and policymaking, and tap talented people from many disciplines and walks of life;

-- NIE must promote inquiry into the contributions of business, labor, educators, and government, so that each, in the words of the Business-Higher Education Forum, may "perform those parts of the overall [educational] effort for which it is best suited;"

-- NIE must reexamine the question of the appropriate institutional framework for quality research, eschewing exclusive reliance on the traditional model of large labs and centers;

-- NIE must reenforce public recognition that there can be no improvement in the effectiveness of schools without corresponding changes in policies relating to teachers, programs, laws, funding arrangements and intergovernmental relations.

If our nation is truly "at risk," we can expect no less from any research agency of government.

SUMMARY OF MISSION STATEMENTS

The Study Group recommends the five mission statements summarized below. These recommendations for research are based on a number of criteria:

- National scope and significance of the issues
- Relevance to pupil performance and other fundamental objectives of education
- Feasibility of research
- Enduring nature of the issues
- Suitability for research in centers

Several potential topics of great importance were omitted because they fell outside of the purview of the Study Group on Educational Policy, e.g., student learning processes and teacher training. The recommended missions are:

For improvement in pupil performance to take place, changes need to be made in schools' governance, financing, personnel, and curricular arrangements. Research must explore the consequences of existing policies, as well as proposed policies, on pupil performance. This center will conduct research for policymakers on the sorts of governmental policies that support or impede the creation of successful learning environments.

Student performance in school is affected by those who teach them. Teacher performance is influenced by teacher and administrator recruitment, retention, remuneration, and promotion policies. This center will examine existing and proposed personnel policies in relation to pupil performance.

Schooling is widely believed to be the route to good jobs. While this may be true for many college-bound youth, there are serious doubts about its truth for those who enter the workforce directly from secondary school. This center will address the basic questions of how education and training for employment are performed in America, how they influence future earnings and productivity, how education and training functions are organized, financed, and managed, and how the organizations that perform these functions adapt to changes in the labor market and society.

Education is the largest single expenditure in every state and most local communities. Effective school performance is shaped ultimately by the fiscal and governmental framework. Educational decisions are made by many levels and branches of government, and responsibility is divided between the private and public sectors. This center will explore the impact of different assignments of decisionmaking authority on pupil performance, accountability to citizens, and public support of education. It will focus not only on the reciprocal relationships among entities, but also on policies and implementation techniques across decisionmaking structures.

This center will study factors that facilitate or impede the interpretation, dissemination, understanding, acceptance, and use of educational research for the purpose of improving educational policy and practice. It will explore the many influences that affect the transmission of research results to potential users and the willingness and capacity of such users to take research into account in their work.

MISSION STATEMENT

POLICY AND PUPIL PERFORMANCE

Summary of Mission:

Schools are charged with many responsibilities. But the central task of the Nation's schools, today and in the past, is pupil performance, particularly the transmission of basic skills in reading and writing, mathematics, science, social studies, and--increasingly of late--computer literacy. Pupil performance is what the citizenry expects of the schools. It is the task on which the schools are ultimately judged as successful or not successful.

For improvement to take place, changes need to be made in the schools, and in their governance, financing, personnel, and curricular arrangements. In order to effect meaningful change in the schools, we need to know not only the consequences for pupil performance of existing policies, but also the new policy requirements needed to implement reforms that will lead to improved pupil performance. We need to learn what sorts of policies support, and what sorts of policies work against, the creation and nurturance of successful learning environments.

What is the Problem?

The past several months have seen the issuance of reports on the state of American education. A mounting body of evidence and opinion now suggests that schools are not meeting public expectations.

- when it comes to pupil performance, particularly to the acquisition of basic skills by American students, the schools are in trouble. As the National Commission on Excellence Report put it: "...the educational foundations of our society are being eroded by a rising tide of mediocrity...."

The problem--how to ensure pupil performance--has been raised to the level of a national issue and given nationwide visibility by these several reports. Policymakers at all levels of government--even before the release of these reports--attempted to respond to this crisis. In some cases, this has led to increased centralization of direction and control and to more uniformity. For example, several local districts and states have established educational standards and objectives along with requirements for passage of minimal competency tests as prerequisites to promotion and high school graduation. In other cases, the results have led to decentralization of direction and control and to variability in curriculum and instructional methodologies. For example, many local districts have established alternative programs and schools.

Will the Problem Continue To Be Important?

Pupil performance is an enduring problem. Past experience suggests that no quick and facile solutions are available. The development and implementation of successful curricular programs, improving performance across a diverse population of students is a complex, difficult, and long-term task. There can be no changes in pupil performance, in the effectiveness of schools, without changes in public policy, that is, legislators, state boards, chief state school officers, superintendents, local school boards, principals, and other education policymakers need to establish the fiscal, organizational, and

governmental framework for excellence. But for these efforts to succeed, we need to know what sorts of governmental policies support, and what sorts of policies work against, the creation of successful learning environments.

What Major Lines of Research Are Needed?

What is called for are lines of research that explore the full range of policy options relating to improving pupil performance. The scope of inquiry should include (1) policy actions at all three levels of government (vertical) and across levels of government (horizontal), e.g., local board action, state judicial action, state administrative action, state legislative action, congressional action, etc.; (2) attention to both substantive and procedural policies, to distributive, regulatory, self-regulatory, and redistributive policies, to material and symbolic policies, to policies dealing with both collective and private goods; (3) consideration of barriers and obstacles to achieving policy objectives; (4) consideration of policy as both an independent and dependent variable—the impact of policy on the correlates of pupil performance, as well as the manner in which policy environments favorable or unfavorable to pupil performance develop; and (5) investigation of policy outputs and policy outcomes, not only what governments do but also what changes result—intended and unintended—as a result of what governments do.

The research should go beyond simple descriptive research—although that may be an important element in the larger picture. Inquiry should include both quantitative and qualitative approaches. Research should be

hypothesis-driven as well as hypothesis-generating, experimental as well as post facto, cross-sectional and longitudinal. It should also draw on a broad range of disciplines and fields of study.

Several existing bodies of research focus on pupil performance and public policymaking, and these literatures will need to be explored. The former includes the work done on teacher effectiveness, school and program effectiveness, mastery learning, competency-based instruction, alternative schools, motivation and incentives, parental choice and involvement. The latter includes the rich literature on policy analysis—particularly those works that focus on the explanation of policy, that use social scientific methodology to examine the causes and consequences of public policy, and that attempt to develop reliable general theories.

Researchers need to acknowlege that schooling policy is not the same as educational policy, but rather a significant subset of it. Educational policy itself is not the same as public policy, rather it is inextricably linked to fiscal, economic, housing, immigration, and other policies. Researchers need to acknowledge the existence of this broader and richer framework. Most decisions affecting schools are not made by educators, nor often do they deal directly with schooling. This suggests strongly the need for research that draws on political science, sociology, economics, law, education, and so on.

The research agenda also must be built around a unifying theme, rather than being just a collection of individual, ad hoc studies. For example, it

might concern itself primarily with the increasing use of standardized achievement tests for a number of policy-oriented purposes.

What Are Some Potential Research Topics and Themes?

A research agenda on pupil performance and public policy might pursue two related lines of inquiry: (1) research on the consequences of existing policies on pupil performance, and (2) research on policy requirements for initiating reforms aimed at improving pupil performance.

Research on the Consequences of Existing Policies on Pupil Performance

- Research is needed on the increasing use of standardized achievement tests for policy-oriented purposes. Local schools and state agencies increasingly are using achievement tests designed primarily for classroom use to: (a) provide evidence on school and classroom effectiveness, (b) allocate state compensatory funds to local school districts, (c) evaluate teacher effectiveness, (d) accredit schools, (e) classify students for remediation, and (f) certify high school completion or grade promotion. What are cost and benefits of such use? Under what circumstances does the Florida approach, i.e., a state test to certify high school graduation, lead to improved performance for all pupils? Under what circumstances does a decentralized approach, i.e., leaving major direction and control of testing to local decisionmakers, lead to improved

performance? What is the range of options available for use of achievement test results to allocate resources? What is the range of possible outcomes--intended and unintended--of using test results in the evaluation of teachers?

- Research is needed in the effects of collective bargaining on school climate. Under what circumstances does the collective bargaining process nurture a positive school climate? Work against a positive school climate? Under what circumstances do collective bargaining agreements promote needed independence and autonomy at the building level? Help or hinder the exercise of instructional leadership by building principals?

Research on Policy Requirements for Initiating Reforms to Improve Pupil Performance

- Research is needed on the political, economic, social and legal policy requirements for initiating reform in the schools. What are the major legal constraints to extending the school year to 200 days? What accommodations will be necessary in the collective bargaining process? What is the range of funding options available to support an extended school year? An extended school day?

- Research is needed on the regulations, laws, and funding arrangements that need to be in place to establish and support

academically effective schools, that is, schools that exhibit high staff expectations and morale, a considerable degree of control by the staff over instructional and training decisions in the school, clear leadership from the principal, clear goals for the school, and a sense of order in the school. Under what circumstances is leadership and autonomy at the building level promoted? Inhibited? What policies are necessary to set in place the organizational and structural variables associated with academically effective schools?

- Research is needed in Alternative Learning Environments. What have we learned about pupil performance from our experiences with alternative schools? Does pupil performance improve under certain sets of "alternative" conditions for certain groups of pupils? Is home learning associated with improved pupil performance? Do "early out" programs enhance pupil performance? Are there new and nontraditional forms of schooling that hold promise for improved performance? What policies nurture the creation of such alternatives? What policies impede, obstruct, or prohibit the creation of new and promising, but nontraditional, pupil learning environments?

- Research is needed on the differential effects of control levels. Under what circumstances might state level establishment of standards and objectives be more effective than

local level establishment? Under what circumstances are symbolic policy actions at the state level conducive to or necessary for effective policy actions at the local level?

MISSION STATEMENT

POLICY AND SCHOOL PERSONNEL

Summary of Mission:

Students' performance in school is affected by those who teach them. Teachers' performance can be influenced by the quality of supervision, assistance, and support they receive from school administrators and other personnel. Therefore, the present crisis in the quality of the school workforce is alarming:

- Too few qualified people wish to become teachers, and the reported academic quality of prospective teachers is declining.
- Opportunities for women and minorities in other professions have caused educaton to lose historically important pools of able and dedicated people.
- Especially in mathematics and science, school districts report shortages of persons prepared to teach, and lose qualified teachers to jobs in business and industry.
- Concern about professional standards, low morale, and "burnout" plague both teachers and administrators.
- There is anxiety about administrators' ability to manage school personnel effectively.

This Center will focus upon a coordinated program of policy research studies concerning the recruitment, retention, remuneration, and career development of school personnel, particularly teachers and administrators.

Rationale:

Throughout the history of schools, the teacher has been the central and often the only figure in the workforce of education. Most people believe that the individual teacher's personal characteristics and role remain the key to good education, regardless of the bureaucratization of school systems and

recent changes in the relationships of teachers to administrators and to school board members. Supervision of the daily work of teachers is widely thought to be episodic and inadequately informed. Hence, issues concerning who teaches and who remains in teaching are seen as vitally important to the functioning of the schools, to efforts to improve pupil achievement and behavior, to regaining public confidence in schooling, and to the well-being of teachers themselves.

The position of head teacher in the early graded-schools of the nation evolved in the past century to that of building principal, district superintendent, supervisor, and central office specialist. Virtually all school administrators still begin their careers as teachers. The growth in numbers of school administrators has been spurred in recent years by federal and state programs with their reporting, monitoring, and evaluation requirements. Some research has identified principals as pivotal figures in establishing a favorable climate for learning in individual schools, and superintendents are reported to be the crucial actors in the introduction of education innovations. Yet there are also those who think administrators are too numerous, ineffective, and misdirected in their work. There are questions about whether the administrators hired and promoted in the hectic "baby boom" years were as well selected and qualified as their predecessors.

Personnel costs have been the largest item in the budgets of local school districts. Distributions of costs have been increasingly affected by the new staffing patterns that emerged with the introduction of teacher aides, resource teachers, and other specialists. "Pull-out programs" are now both common and controversial; we know little about whether these patterns change pupil achievement and how teachers organize their time and tasks, or if staff morale and school-community relations are improved. Laws and regulations

increasingly affect school personnel, including those in nonpublic schools, but with what results? How do student-teachers and classroom aides figure in career development, job satisfaction, and the teacher status picture?

Policymakers have already begun to respond to wide public interest in the problems of teacher quality, crucial shortages of trained teachers in key teaching fields, recruitment of teachers from business and industry, tenure, termination, and other matters. Various states have passed laws mandating "competency testing" of prospective teachers in the basic skills and in their knowledge of subject matter. Proposals have surfaced to respond to market forces by differential salary schedules and by recruiting persons wishing only short-term careers in education. There are plans for "master teacher" status and advancement through teaching by established ranks; these have implications for salary differentials and presumably for staff development, curriculum leadership, and attraction to and retention in teaching of able and ambitious persons. In a single bill passed in mid-1983 (Senate Bill 813, the Hughes-Hart Education Reform Act), California changed its provisions to dismiss probationary teachers, mandated teacher relicensing every 5 years, created a category of "Mentor Teachers," authorized districts to hire noncredentialed teachers under a "Teacher Trainee Certificate" provision, funded higher salaries for beginning teachers, lengthened the school day and year--these among many other provisions. Patterns of implementation of these provisions and their knowable effects need study and assessment.

There are now significant opportunities to consider policy options in the training, licensing, selection, and assignment of educational administrators, given the prospective retirement of many administrators hired during the 1950s and 1960s. Significant changes in their duties were caused by the advent of federal and state mandates for monitoring and reporting on programs

and by the growth of collective bargaining. Arguments are being heard for bar examination type state licensing of school administrators, beyond which individual districts might impose additional requirements of training and experience. There is pressure from professional organizations to offer their programs as alternatives to the certification programs of institutions of higher education. Teachers' organizations may seek participation in screening candidates for administrative positions, and they have an interest in state laws regulating the ratio of administrators to teachers.

Even without the current visibility of these issues, partly because of nationally distributed reports, we find that a program of coordinated research into key dimensions of the education workforce, and attendant policy analysis, to be both an essential and unprecedented mission of educational research, of enduring and national importance. We propose multidisciplinary and cross-professional studies, including but not limited to the special perspectives of labor-force economics, manpower planning, demography, political science (especially of state governments), sociology of organizations, history, labor-management relations, occupational psychology and sociology, and public-sector economics. We see scholars and trainers in teacher and administrator education collaborating with those in business schools, public-sector management programs, public policy shcools, and perhaps involving other professional schools' specialists in the manpower and career development issues of the social welfare, nursing, and health professions

Scope of the Mission:

We have explicitly chosen to focus this mission on recruitment, retention, remuneration, and career development of school personnel. The scope of our work excludes two important and related areas: (1) the preparation of teachers and administrators in preservice and inservice programs and (2) the behaviors

and performances of teachers and administrators in their jobs. There is a research and development tradition in each of these areas; work is ongoing. The topics fall within the scope of other study groups.

The State of the Research:

Comprehensive research on recruitment to teaching is limited and outdated, much of it done in the 1950s and 1960s when extreme teacher shortages caused 40 percent or more of college and university undergraduates to declare themselves potential teachers. Recent, spotty research on the characteristics of the shrinking applicant pool indicates declining numbers and commitments, and lower academic qualifications. Research is needed on the effect of rising public concern and policy initiatives on self-selection and recruitment processes. More is known about being prepared for teaching than about those who complete, who are employed, and who persist for given periods of time. NIE has recently issued an RFP on the subject of teacher selection and how selected school districts attract, choose, and assign new teachers; it could yield useful descriptive data and analysis for this Center mission. Little is known about the characteristics and career patterns of nonpublic school teachers, the differences betwen the secular and church-connected sectors, and about movements of teachers between the public and nonpublic schools.

Patterns for recruitment into school administration are not known through systematic and comprehensive research. Much the same can be said for the dimensions of remuneration, retention, and career development. There are isolated studies on who leaves teaching and the reasons given, on job satisfaction (which show women and elementary school teachers more satisfied than men and secondary school teachers), indicators of the importance of psychic rewards in the structures of teaching, the different patterns of

teaching and administrative experience for men and women administrators, the major career patterns of school superintendents (published in 1960), and the career aspirations of candidates for administrative positions. Many of the conditions of work in education and the respect and self-image of the profession have changed since this research was done. A career in education was once a path of upward social mobility for successive groups in the population; has it ceased to be that and, if so, what alternative attractions can be constructed by policymakers?

The collection and standardization of data on the education workforce are badly needed. Longitudinal data on individuals are particularly essential in order to assess the workings of policies aimed at promoting the effective recruitment, adequate remuneration, retention, and career development of the more talented and competent school personnel. Comprehensive information collection, analysis, and dissemination systems are especially necessary at the levels of the individual state where policy options, if generated elsewhere, are considered, enacted, funded, and (we hope) evaluated.

Research Agenda:

Issues in Recruitment to Teaching and School Administration:

(a) Supply and demand in the context of labor market trends, demographic changes, and higher-education variables like cost, financial aid, admission standards, anticipatory socialization of prospective teachers, and faculty resources. What would be required in the way of tuition grants, loans, salaries for student-teachers and administrative interns, and nonmonetary inducement for education careers to compete with other fields where beginning or maximum salaries and career advancement may be better? What evidence is there that past or present programs have gone to the best potential teachers and built careers in education? (Since 1958, $500 million in federal loans have been forgiven for those prepared to teach in public schools.) What would

be the general and specific effects of state or federal programs of selective financial aid?

(b) Social and academic characteristics of those who have entered and are entering training, completing programs, and securing positions as beginning teachers and administrators. Relationship of economic background, race, ethnicity, gender, academic aptitude, patterns of psychological interests and motivations, and college and university standing to entry and persistence, choice of institution for professional preparation, performance in the program, relative achievement on screening and competency tests, and selection of positions. Local school superintendents have long been selected through personal influence operating through "networks." What are the cost-benefits of this historic pattern, expecially on opportunities for women, minorities, persons with nonstandard backgrounds? What are the realistic options?

What would be the short- and long-term effects for different population groups and different professional-training institutions of expanded proficiency examinations as barriers to admission into training, and higher standards for passage? How do these effects compare with effects on public attitudes, images of school careers among recruitment pools, morale among experienced teachers and administrators, attitudes of school board members? What if such tests were extended to the already credentialed and experienced workforce, including administrators, counselors, and other personnel as well as to classroom teachers?

Issues in the Certification of Teachers and Administrators:

(a) Four-and-five year programs as they influence recruitment, completion, entry, and persistence in teaching, experience with "emergency credentials" and special waivers and their "lessons" for the employment and regulation of nonregular, nonlicensed teachers and administrators. Relicensing

requirements. What is, for example, the optimal governmental arrangement for securing and supervising teachers on loan from the private sector or using graduate students in shortage fields to teach part-time?

(b) The composition of licensing boards and commissions in education and their relation to policies on teacher and administrator preparation and licensing, growth or mitigation of professionalism, and relations between the different sectors of the education "establishment." Does the greater authority given to "representatives of the public" contribute to the "de-professionalization" of education, and with what consequences?

Issues in the Remuneration of School Personnel:

(a) Reconsideration of the operations of the single-salary schedule for elementary and secondary school teachers, teachers in different fields, and men and women teachers. What if this principle were voided by installing differential pay, based on market factors and/or merit pay programs? What would be its probable effects on selective recruitment, retention, and career development and on the general economic position of the teaching force? How does the tenure system operate as a form of nonmonetary reward and what would be the cost-benefits of a different system?

(b) Policy options in improving salaries for beginning teachers or for mid-career teachers, applications to teachers of the salary practices of school administration, and the extra pay for extra work strategy. What would be the consequences for recruitment, retention, and career development of changing the common practice of concentrating salary gains in the first 12 or so years of professional service? What would be the effects on recruitment of administrators if changes were made in the reward structure of teaching?

Issues in Retention and Career Development:

(a) Retraining needs and transfer arrangements generated by the co-existence of selective shortages and reduction-in-forces due to school

closures, shifts in enrollment patterns among school subjects, and changes in government-mandated programs. What are the cost-benefits of funding policies to promote participation in teacher centers, summer sessions, sabbaticals, and subsidized internships in schools, classrooms, and central offices?

(b) Proposals to establish ranks or "career ladders" within teaching in order to differentiate the workforce in reward, responsibility, and status, establishing incentives to develop teacher leadership in preservice and inservice activities, curriculum revision projects, induction of new teachers, professional association and union work, teacher-administrator collaboration in school governance, and school-community relations. What are the relative advantages of "eased entry" and the historical patterns of high turnover and teacher-to-administrator mobility compared to stability of the workforce through retention policies?

(c) Opportunities for greater teacher autonomy, conditions of work, the workplace, prestige factors, the local presence of nonpublic schools, and other nonsalary factors operating on retention, mobility, and job satisfaction. How do factors like class and school size and school location relate to morale and performance at different stages in the careers of teachers and administrators? What have been the relative effects of collective bargaining laws and practices and organizational activity on career development, public opinion, and legislative behavior in these areas?

Audiences and Consumers for the Center's Research and Development:

The policy research, policy analysis, and policy hypotheses or recommendations generated by the proposed Center will have numerous audiences which are vitally concerned with issues of the workforce for education. They include policymakers at the federal level; members and staff of state legislatures; state departments of education, coordinating boards, and

licensing commissions; local boards of education and their state and national associations; faculty and administrators in teacher education departments and their college and university-wide administrations; teacher and administator organizations at the national, state, and local levels; leaders in teacher centers, teacher shelters, and teacher networks like the Bay Area and National Writing Projects; the education councils and organizations of business and industry; and test producers. More or less, interest will also be shown by the media, parent-teacher organizations, civil rights organizations, taxpayers' organizations, and nonpublic school groups.

Prosposed Organizational Form:

The research agenda proposed for this research and development center is of national importance, long-term, multidisciplinary, and capable of being programmatically integrated. Because of (1) the particular constellation of issues and needed resources for the research agenda and (2) the inadequacies and problems associated with existing R&D center organizational forms, it is proposed that a different model be followed: the disaggregated or "spin-off" model.

Assuming a 5-year contract between NIE and the designated offeror, the following arrangement is suggested and rationale given:

YEAR ONE: Concentration at a single institution of the senior staff (Principal Investigator/Director and Satellite Centers Heads of Research). Selection: The most competent and knowledgeable researchers and policy analysts from the nation's resources, drawn from different universities and, desirably, including also qualified individuals from corporations, professional associations, state agencies, etc., who are competent in research design and policy research. By means of 1-year leaves

of absence from their home institutions or bases, an outstanding body of associates can be assembled in one place. The attractions to engage peers in such a collaboration should be considerable. Task: To develop the research plan, in detail, including the allocation of assignments and resources, development of timetables, establishing procedures for communication of information on work in progress, etc.

YEARS TWO THROUGH FOUR: Pursuit of the research plan at Satellite Centers, each under the direction of a research head, with the involvement of junior staff, the employment of graduate students, offering of research colloquia and seminars, etc.

Subcontracted projects may also be done in this phase. The Principal Investigator at the Center site would direct research on an indicated part of the total plan, communicate with heads of Satellite Center projects, facilitate Satellite Center contracts, and convene an annual or semiannual meeting to report on and assess work in progress. Secretarial and other staff would be located where the research is being conducted, and the needs at the center site would be minimal except in Year One and perhaps in Year Five.

The location of Satellite Centers and their agendas, and the determination of their major participants, would be based upon unique concentrations of talents and interdisciplinary and interogranizational resources. For example, the research component focusing upon recruitment issues might be located where there is a constellation in various departments, institutes, professional schools, and other organizations that

include labor market economists specializing in public-sector employment, occupational psychologists, historians specializing in the education workforce, and teacher educators doing extensive longitudinal research.

YEAR FIVE: Report writing, determination of policy hypotheses and recommendations, and dissemination activities, coordinated at the Center site, with occasional meeting of Satellite Center heads as necessary. Planning of transfer of work to networking systems, a Special Interest Group in the American Educational Research Association, etc.

The chief merits of this model are these: (a) It allows access to the best talent throughout the professional staff because it does not require a 5-year physical concentration in one place and unduly disrupt people's professional lives; (2) It recognizes that the most pertinent ancillary resources (as in schools of public policy, law, business, and subspecialites in colleges and schools of education) are also geographically scattered; (3) It builds up centers of research and dissemination and bodies of collaborating researchers, graduate students, policymakers and policy professionals, and field professionals in various locations. This has the potential for continuing research and development after the Center's mission is complete, promoting dissemination more widely, and enhancing the dissemination that comes through networking; (4) It holds more potential for broadening research competence and expertise in the national educational research community than does concentration in a single location throughout, since it deploys research into several existing research and research-training channels while promoting new alliances at the Satellite Centers.

There may also be savings in overhead, greater flexibility in space and staffing, and other advantages as well. We think, however, that the criterion of access to the best talent, and the opportunity to put that talent together in a workable manner, outweighs the convenience of administration and communication at a single site.

MISSION STATEMENT

POLICY ON EDUCATION AND EMPLOYMENT

Mission Summary

This statement proposes a research center on education and employment. The center will address the basic questions of how education and training for employment are performed in society, how they influence future earnings and productivity, how the education and training functions are organized and financed, and how the organizations that perform these functions adapt to changes in the labor market and society. The research agenda for the proposed center will address reward structures for noncollege bound youth, descriptive research and model-building on the organization of education and training, and empirical tests of competing models of labor entry, mobility, and success. The center will require a genuinely interdisciplinary staff. Funding for the center should take account of the need for new data collection on certain topics. The center could be organized either as a single, centralized unit or as a network of scholars in different locations collaborating around a common set of topics.

What is the Problem?

For many years, we have told our youth that schooling is the route to good jobs. While that may be true for many college-bound youth, there are serious doubts about whether it is true for those who enter the work force directly from secondary school. These young people face a set of opportunities that is

neither as clearly defined nor as well organized as that for college-bound youth. The challenge of the next decade is to make the rewards of education and work a reality for young people who may not seek a college education. Part of this challenge lies in research designed to explore more fully the connection between education and work.

The relationship between learning and work is one of the most enduring problems of our society. This problem takes a number of forms:

- complaints from employers about the preparation of young people applying for jobs;
- uncertainty among educators about what they should be teaching;
- alienation among a segment of the youth population who participate fully in neither school nor the workforce;
- expectations about success that are unfulfilled by career opportunities; and
- unemployment and lost productivity among adult workers stemming from inadequate training and retraining to meet changes in the economy.

As the economy and the composition of society change, the relationship between learning and work also changes. New segments of the population enter the labor force, new skill requirements develop, new expectations arise about the relationship between schooling and work, and new ideas are advanced about the role of policies, markets, and organizations in determining employment and productivity. To a large degree, our ability as a society to anticipate and respond to these changes depends on a strong base of research about the relationship between learning and work.

Research on learning and work addresses the broad questions of--

- How are education and training performed in society?
- How do education and training influence the employment and productivity of young people and adults?

- How does schooling influence young peoples' entry to the labor force?
- How are education and training financed and organized across the array of local institutions that perform these functions?
- How do different types of organizations affect the employment of young people and adults?
- Are there alternative employment mechanisms that provide opportunities for noncollege-bound youth comparable to those now employed by college-bound youth?
- How do schools, employers, and other organizations adapt to changes in the labor market and the composition of society?

The major problem is emphatically not how to make schools work more effectively by themselves, but how to make the whole array of policies and organizations that affect access to the labor market work better for young people and for adults who need retraining.

Will the Problem Continue to be Important Over the Next Decade?

The evidence is strong that the relationship between learning and work will continue to be an important policy issue over the next decade.

- More than 50 percent of young people between 16 and 19 years of age are engaged in school and work at the same time. By their attitudes and behavior, young people are signalling to society that they regard both work and school as important, and they expect to do both.
- The school drop-out rate, between the ninth and 12th grades, is estimated to be 28 percent for the nation as a whole, and in the range of 45 to 50 percent in large urban school systems. A substantial proportion of the present youth population will enter the

labor force without conventional educational credentials, which suggests continued problems of training and retraining as these people become adults.

- About half the new jobs created in any given year are in firms that will not exist 2 years later. The more active the economy, the more important are labor market skills that can be transferred from one firm to another, and the more the health of the economy depends on institutions that smooth the transition from one job to another.
- Labor force participation over the last decade has risen dramatically among minority and nonminority females, it has remained stable for nonminority males, and it has declined for minority males. These changes in the composition of the workforce portend changes in the relationship between childrearing and work and persistent problems among the chronically unemployed.

<u>What Challenges Will Policymakers Face in this Area over the Next Decade?</u>

The major challenge facing policymakers over the next decade is how to make the loosely-organized system of policies and institutions that work on the problem of learning and work more responsive to the demands of the economy and society. Policy has a number of effects on learning and work, some of which are intended, some of which are unintended. Understanding how policy works is the first step to understand how it might be improved.

Policy affects the relationship between learning and work in a number of ways:

- It sets basic constraints in on wages, hours, and conditions;
- It creates new institutional structures or reinforces existing ones;

- It directs employers' hiring decisions toward certain types of people by offering positive incentives, or introducing constraints;
- It directs education and training at certain skills and certain types of people by providing subsidies to individuals and organizations.

These functions are performed under a variety of different statutory authorities, implemented by a complex array of organizations, working at all levels of government. The policies include institutional subsidies through grants to state and local government, employer tax credits, loans and grants to individuals, subsidies to employment services, and regulations. The result of these policies is a highly fragmented and balkanized set of institutions--regulatory agencies, public and private employment services, high schools, public and proprietary vocational schools, community colleges, public and private community-based organizations, and voluntary organizations.

Many attempts have been made, over the past 20 years or so, to improve the performance of these policies, often with limited success. The problems created by these policies and institutions will not go away of their own accord. They require sustained attention by policymakers and careful scrutiny by researchers. Among the major questions to be addressed are:

- Do regulations on wages, hours, and working conditions create disincentives for employers to invest in workplace training? Or, alternatively, at what level do the costs of regulations, in terms of lost opportunities for training, begin to outweigh their benefits, in terms of protection for target groups?
- How do systems of controlled entry to the labor market--apprenticeships, for example--affect access to training and later opportunities? And how do labor-management agreements on conditions of entry affect access to training and later opportunities?

- What is the fit, or lack of fit, between publicly-subsidized vocational education and the skills demanded by employers? What incentives would increase this fit?
- What is the relationship between learning and credentials on the one hand, and employers' hiring decisions on the other hand? Does increasing the basic skills and employability of high school graduates increase the likelihood that they will be employed, or does it simply raise the entry standards that employers use to screen applicants? Under what conditions could improvement of high school preparation be expected to result in improved employment prospects?
- What are the returns to individuals and society on investments in education and training? How different are the returns on different types of learning and credentials?
- What are the comparative advantages of schools and employers in the provision of training? Do employers select on "general" skills and train for "specific" skills? Under what conditions? Does schooling increase the mobility of labor? Under what conditions?
- Are some organizational arrangements for the provision of education and training more responsive to shifts in the demand for labor than others? If so, what makes them more responsive? What alternative models for organizing education and training should policymakers be aware of?
- Are some organizational arrangements more responsive to demands for retraining of adult workers? If so, what makes them more responsive?

These are recurring questions which must be addressed persistently over time by researchers and policymakers as the conditions of the economy and the composition of the labor force change. There are no simple answers; there are only degrees of certainty. Failing to address these questions in a systematic and sustained way, however, means that the responsiveness of policies and institutions to changes in the economy will be more a matter chance than design.

What New Research Will Be Needed Over the Next Decade?

In addition to these persistent questions, research on learning and work will need to develop new areas of inquiry to be responsive to changes in the economy and society. Among the areas in which new research is required are:

(1) Research on reward structures for noncollege-bound youth. For a society in which more than one-quarter of the secondary school population does not finish high school, about one-half of those who finish high school do not enter college, and about one-half of those who enter college don't get degrees, we focus too little attention on the rewards that are offered those who do not enter or do not complete college. We know that failure to complete high school significantly affects future earnings. But we don't know very much about why young people don't complete high school, or about the options that high school dropouts face. Nor do we fully understand whether, or how, schools recognize the talents of noncollege-boung youth. Our dominant norms of achievement are so tied to college attendance that we have neglected to understand opportunities and reward for those who do not attend college.

The high proportion of dropouts and of young people jointly pursuing school and work suggest that young people are finding alternatives to secondary education. These alternatives may not be the best or the most productive for society. Preliminary research suggests that high schools focus

their best efforts on students who intend to go to college, provide alternative voctional training for the limited number who express a specific vocational interest, and provide a so-called "general" education for the rest. It is this latter group, constituting the largest proportion of students in many high schools, which may represent the largest loss of talent from the educational system. Are the perceived rewards of staying in school sufficient to keep this group engaged in education? Are there ways to restructure high schools so that they motivate and reward success short of advancement to college? Are the rewards for teaching, counseling, and helping these young people sufficient to assure that they get adequate attention from the adults who work in secondary schools?

(2) Descriptive research and model-building on the organization of education and training. One of the most persistent problems of the current fragmented and balkanized system of education and training is that we lack an understanding of how it operates and, more importantly, what forms of organizations are likely to be most effective. Program evaluations typically focus on one specific piece of the system, ignoring its relationships to other parts of the system. Economic research typically examines the relationship between individual attributes, policies, and measures of employment, often ignoring the institutional setting in which individual attributes are determined and policies are implemented. Ethnographic research typically focuses on how individuals behave in social settings, at the expense of asking how those settings could be altered to work more effectively.

What is lacking thus far in research on learning and work is sustained analysis of what institutional structures exist, how well they work, and what are the plausible alternatives for changing those structures. There are, for example, significant differences in the way the United States, European

countries, and Japan approach the connection between schooling, training, and work. Many Northern European countries, for example, have constructed integrated systems of vocational training and retraining, unemployment compensation, and economic development. These systems may be more effective at moving people into the labor force and at retraining displaced workers, or they may impede these processes by introducing constraints on the labor market. Most industrialized countries have a much lower rate of participation in college education than the United States, but many have more highly developed systems for postsecondary training in business and technical occupations. Is it possible to increase the responsiveness of labor supply to changes in technology by diversifying nonbaccalaureate degree programs? U.S. employers invest large amounts of money in education and training for their employees, yet we know very little about the way these activities are organized and whether they suggest new models for publicly financed education and training. In order to pose serious alternatives to the present system of education and training in this country, we need sustained inquiry into what those alternatives are.

(3) Specification and testing of competing models of labor market entry, mobility, and success. The current literature contains a rich array of theoretical models on the relationship between learning and work. Human capital theory suggests that individuals and employers make education and training decisions based on expected returns, that there are differences in the returns to workers and employers between "specific" and "general" skills, and that policies designed to influence the labor market frequently have perverse effects on workers' and employers' decisions to invest in education and training as well as on the mobility of labor. Alternative theories suggest that schools train and employers select on attributes that have, at

best, an indirect relationship to expected returns. Attributes like punctuality, reliability, passivity, and tolerance for control are, according to this view, more important to employers than expected returns. Still other theories suggest that the labor market is, in fact, a collection of stratified, segmented, and separate labor markets, each of which works in a different way, depending on the type of work to be done. Determinants of access, entry, and success that apply in one labor market may not apply in another.

While these and other theories have generated a great deal of productive research, they have not always resulted in research that spoke usefully to policymakers. Part of the problem lies in the fact that research, to this point, has used relatively crude measures of education and training, such as years of schooling, educational credentials, and work experience. These studies represent the best that can be done with existing data. In order to get to a higher level of policy-relevance, the next generation of research must concentrate on developing more refined measures of education and training. This, in turn, will probably require more sophisticated data collection that has been done in the past.

Another difficulty with existing research is that competing theories have been used primarily to generate hypotheses for further research, rather than to focus policymakers' attention on important problems of policy content and delivery structure. Consequently, when policymakers look to researchers for advice, they get competing and contradictory guidance. One element lacking in the research thus far is an attempt to elaborate and test competing theories as models for policymaking and organization. Addressed on this level, competing models may have much more to say about the likely effects of new policies than researchers have been able to say thus far.

What Resources and Institutions Will Be Necessary To Do This Research?

If research on learning and work is to be well done and useful for policymaking, it must have at least the following attributes:

(1) It should be genuinely interdisciplinary. The major deficiency of existing research on learning and work is not its quality, but is disciplinary focus. Economists have focused largely on the operation of labor markets, at the expense of institutions; sociologists have focused largely on the determinants of income and social class, at the expense of policy; evaluators have examined specific programs, at the expense of the larger policy issues raised by those programs. One argument for investing in organized research on learning and work, as opposed to simply allowing discipline-based research to run its course, is to break down these disciplinary boundaries and focus attention on the relationship between policies, markets, and organizations.

Simply putting a group of researchers from different backgrounds together in the same setting won't accomplish this purpose. Members of the group must demonstrate sufficient fluency in the research of other disciplines to merge their work with those disciplines. Evidence must exist that members of the group can develop and pursue a common research agenda, rather than a collection of independent projects organized around a set of themes. Researchers should also give evidence, from their prior work, that they can treat existing models of access, entry, and mobility with a high degree of detachment.

(2) It would probably involve new data collection, rather than just re-analysis of existing data. Much of the analysis in this area has been done on existing data files--the National Longitudinal Survey, special versions of the Current Population Survey, etc. These data files are useful, but limited in their ability to probe institutional and policy questions. Researchers

should be prepared to suggest how additional data collection could be used to sharpen the focus of research on institutional and policy questions.

(3) It should entail explicit connections with policymakers and practitioners in the field. Another major problem with existing research is that it seldom connects with policymakers and practitioners in ways that are useful to them. It is one thing, for example, to document the extent to which young people drop out of high school and how dropping out affects future income, but quite another to suggest how existing institutions could be altered to minimize the incidence and effects of failure to complete high school. The latter requires not just research on the aggregate effects of attainment on income, but also a familiarity with the way high schools and alternative programs work. It also requires an understanding of how policy can influence schools and alternative programs in useful ways.

One argument for organized research on learning and work, as opposed to leaving the accumulation of knowledge to individuals pursuing discipline-related questions, is that it will increase the usefulness of research to policymakers and practitioners. Researchers should demonstrate how these connections between research, policy, and practice can be nurtured.

(4) It might be organized either as a single, centralized research center or a group of scholars in different locations collaborating around a common set of topics. This is an area in which substantial research has already been done. There are, consequently, a number of researchers in a number of different settings with a strong interest in the area. The additional resources may be sufficient to draw together a strong interdisciplinary group in one location. Or alternatively, a better use of resources might be to form such a group from researchers working in a number of locations. Organizational plans should be sufficiently flexible to allow for either possibility. Researchers should be encouraged to propose either kind of organization.

MISSION STATEMENT

GOVERNANCE AND EDUCATIONAL POLICY

Mission Summary

Effective school performance is shaped ultimately by the governance framework. The growing dissatisfaction with educational performance has brought some questioning of the decisionmaking framework. Can the efficiencies of private industry be in some way introduced into public education, without causing equity difficulties? Should responsibilities and fundraising obligations be allocated differently by level of government? Changes in decisionmaking responsibilities may alter school performance, and they may be valued on their own. We propose an interdisciplinary center, composed of lawyers and social scientists of various types, to study these matters.

Rationale

Like all areas of public policy, education raises profound issues about how and where authoritative decisions are made. But these issues have frequently been treated in isolation from each other. Some debate whether education should be primarily public or private, with governance made largely through majoritarian policies or through preferences expressed in the market place. Others focus on federalism, attempting to understand decisionmaking among local, state, and federal governments.

Even if there is agreement over the assignment of responsibility, still other complexities of governance remain. The private sector is multifaceted, requiring understanding of the appropriate roles of business, nonprofit corporations, secular and sectarian schools, testing services, textbook publishers, and the like. On the other hand, governments are also multifaceted. Executive, judicial, legislative, and various blends of these functions operate in distinct agencies, with overlapping responsibilities and constituencies. Operation within a multiple-level system of governance means there is great variation in education policy. Such an intergovernmental variety suggests learning opportunities for practitioners (what fits my needs) and research learning for scholars (what accounts for observed differences).

Given such complexity, we propose that a Center be established to study governance mechanisms--including public-private control and intergovernmental relations--and their link to student performance, combining such issues in an integrated research agenda.

In recommending this mission, we believe that decisionmaking and governance--and their student performance consequences--are critical, in the 1980's and beyond, for a number of pressing reasons.

- The "Who decides?" question cannot be disentangled from the question of improving student performance and outcomes. For example, the empowerment of local school districts and parents over certain kinds of decisions may or may not have a favorable impact on student performance. But it may also have the consequence of generating parental support for the school system. One level of government may be more efficient in implementing a policy than another, and some tasks--perhaps some forms of vocational education--may be better performed in the private than in the public sector.

- Accountability, control, and decisionmaking authority may be important to understand in themselves. In any policy dispute, whose values are to be legitimate? In a federal system, many different values get legitimated. How states react to federal education concerns, how districts relate to state authorities, how district authority is interpreted by local professionals and parents--none of this uniform. Each level has its own interests and values to define and protect in school policy. Sometimes action focuses on these divergent interests undermines action at other levels; sometimes they reinforce each other.

For example, there are disagreements about the appropriate missions of education. But even when there is agreement at some high level of abstraction--e.g., more effective schools--many specific decisions must be made and these are debatable also. What skills are to be imparted? Should

values be taught, and what values? How ought the various tasks be performed? Whose views will be accepted? In short, these are questions of legitimacy, always an issue in a democracy, and they relate to public support for education and public willingness to trust administrators and teachers. In addition, even in an efficient educational order, one that produces desired student outcomes (e.g., self-sufficiency, ability to find and hold a job, etc.), there are other issues of equity and distribution. These thorny questions of "Who gets what?" need to be decided in a manner that is fair, and is perceived to be fair. This inevitably involves consideration of alternative governance mechanisms; their variety is extensive in a federal nation, and their utilities are major research questions.

- In our policy system, regularly interacting with each other are levels of government, branches of government, and the public and private sectors. It is important to understand these reciprocal relationships if strategies are to be devised to enhance learning, to be accountable to parents and citizens, or to develop any other set of policy goals. Minimally, this suggests that policies and implementation techniques might be studied for patterns <u>across</u> decisionmaking structures which may be drawn on for anyone's use. For example:

  - Given variation among government levels, what difference does it make how policy is made and implemented, and at what level, in building effective schools?

- The effective schools literature suggests that public schools might benefit from policies in private schools that produce greater teacher and principal autonomy, firmer discipline, and a more academically-oriented curriculum.

- Courts implementing federal civil rights and education mandates might borrow a chapter from the implementation techniques of administrative agencies.

- Some market mechanisms might be imported into the public sector (e.g., the relaxation of residency requirements for school attendance in a district, voucher or voucher-like schemes).

- Regulatory techniques might be examined more closely in relation to the private sector (e.g., regulation of private schools, validation of private-sector tests used in the public schools).

- Recruitment and retention policies might be compared across secular private, parochial, and public schools, and consideration be given to the varying laws that cover labor relations in each type.

- Do many such policy issues vary systematically because of underlying state and local cultures, the population's status distributions, etc.?

In short, by studying governance and education policy broadly, researchers might draw on rich experiences to create options and alternatives to meet such goals as student performance, equity, accountability, and legitimacy.

Education operates not only in a context of government impact, it also is influenced by other national forces. Demographic changes, economic cycles, professional norm setting -- all are factors that affect the variation among states and districts. Their interaction with the intergovernmental network is rarely studied, but this is the real-life context in which policymakers and practitioners do work. In sum, programmatic concerns become real only within the existing federal system of education, as it is impacted by private-sector factors.

If this research orientation is pursued, a variety of disciplines will clearly be needed. Political scientists and lawyers understand allocation of power, legitimacy, federalism, legal mandates, and such institutions as courts, legislatures, and administrative agencies. Economists have much to say about markets--their glories and imperfections. Public choice theorists have made profound contributions to the study of market-like mechanisms in the public domain. Power and money are not independent, and so the mission should draw on the work of school finance experts. Implementation and organizational theory provide important insights into incentive structures, institutional regularities, the efficacy of external mandates, and the like. As difficult as it may be, the goals should be to integrate the various conceptual approaches and to allow for a healthy cross-fertilization.

We also believe that it will be necessary to attract first-rate minds in these disciplines, and especially some who have not previously related their work to education policy studies. The insularity of education research--not

unlike that of any other field--will need to be overcome, as well as the insularity of those who hold different visions as to how social life may be organized and explained.

Note that such talented people who would be ready to cooperate in such research may be spread across the nation, and so may not be willing to relocate or to become part of a large-scale institution. Moreover, they may be willing to devote only a portion of their time to these studies and so would not respond to the traditional incentives for education research. Therefore, a "networking" approach is seriously urged, with a Center consisting of personnel drawn from many campuses, private industry, and practitioners--but not on a full-time basis. Funding for the Center ought to allow the linkages among disciplines to be made in a flexible manner that accommodates the scarcity of talent, the lack of a critical mass of people in any one place, and the different levels of commitment to education policy and governance research.

Major Lines of Research

In proposing new research in this area, we are mindful of the fact that this new Center would not be starting from scratch. For example, the field of intergovernmental grants has been carefully worked over by the IFG at Stanford and over a longer period by the Advisory Commission on Intergovernal Relations, as well as others (Municipal Yearbook, Book of States, etc.). It is rare, nowadays, to find a state that does not have a computer model that can quickly tell legislators how much various school districts would get under various state-aid formulas. There is an organization of school finance

specialists and a journal on the subject. There have been analyses of plans to alter the public-private balance in education--such as vouchers or performance contracting schemes--and we are beginning to see comparisons (and recomparisons) of public and private school systems on some dimensions. There have also been many studies of the legal framework within which governance decisions increasingly are made.

With all of this past research--a literature that includes many excellent studies (and to be sure, many mediocre ones)--one might ask why another Center and more research is needed. There are basically three answers:

- These issues have been at the heart of education policy for many years--absolutely central for the last two decades--and it is impossible to imagine giving up research.

- In this area, more than any other, new proposals are constantly appearing on stage. In the 1960's, it was desegregation; in 1968, it was the Serrano decision; in 1970, it was special revenue sharing; in 1972, performance contracting, later vouchers; in 1981, tuition tax credits; and in 1983, the Mueller decision. There is a continuing demand for new analysis to respond to new policy events.

- Research here is difficult. Even if a moratorium were declared on new policy proposals, analysis would be still necesary to refine estimates, appraisals, and so on. Perhaps this rationale would not be put forward for all types of educational research; we deem it vital to do so for this crucial area.

Turning to a more specific list of research questions for the 1980's, we have grouped these into those that generally raise the public-private balance issue, and those that generally involve federalism issues within the public sector. Obviously, the true distinction is not quite so neat.

Federalism (Level of Government) Questions:

- Analysis and re-analysis of the impacts of different types of grant arrangements between higher governments (federal or state) and local school districts, e.g., compensatory education programs, impact aid, power equalization grants, categorical grants, effort maintenance grants, block grants, and whatever any new president, governor or legislature may devise.

- The carrot or stick problem of implementation. If a state (or indeed the federal government) desires to make a change, is this best done by grant incentives, legal mandates, some combination, or what? Are some approaches better suited to some problems? Are some approaches better suited to some types of school districts—urban or rural, bilingual, regional, etc.?

- If the state is to exercise its Constitutional role to provide effective education, what are the special competencies needed by its state-level agencies? What capacities in the form of trained personnel and in data collection and analytical methods are needed for the three branches of government, based upon fruitful experience in peer states?

- Given the range of educational services and goals of school districts, are some more effectively implemented by the district alone, by inter-district cooperation, by sharing with the county or state, or by state pre-emption? What patterns exist among the states for a given service area, and what operating principles underlie these, such as political culture? Does shifting control up or down the intergovernmental scale increase effectiveness, efficiency, or costs? Or does such a shift depend upon the redistributive or distributive effects of a given policy?

- Do differences among states in compulsory education, competence testing, and graduate requirements demonstrate different consequences for preparing children for adult self-sufficiency (e.g., in reducing functional illiteracy?)

- Does action at different levels of government create different program effects? For example, what are the implications for minority member and noncertified teachers produced by varying state regulations for teacher education and certification? Do federal programs or state schooling services for limited English-speaking children exhibit different effects?

- With textbook content controlled by the volume of sales generated in just three states, can different networks of states organize to produce curriculum materials (including computer software) benefiting their values?

- An ultimate question may be: given relatively static state and district systems where education policy changes only slowly, how do they change non-incrementally when innovation is urged throughout the land? Why do some states and districts respond slowly, and some quickly, to these changes? That is, in the successful diffusion of innovaton, what is the role of levels of government, of professionals, and of citizen interest?

Public-Private Issues:

- Analysis and re-analysis of attempts to introduce markets, or market-like mechanisms, into public education (vouchers, performance incentives, school district reorganization, cooperative efforts between public and private schools).

- The implication of the Mueller decision, allowing some forms of state support to private, religious schools for private schooling and for federal tuition tax credit proposals.

- The role of private testing services vis-a-vis public school curriculum and teaching practices, particularly with regard to the implementation of effective schools proposals.

- The impact of the National Labor Relations Act, Title VII, federal tax policies, and the Fair Labor Standards Act on private schooling.

- The impact of increased public support of private education on racial integration of student bodies, residential segregation, and public support of public schools.

- The impact of collective bargaining on public and private schools and a comparison of the implications for governance in each sector.

- The nature, extent, and significance of corporate influences on public education, including curriculum, personnel, and governance.

- The legitimate and permissible limits of governmental regulation of home instruction.

Concluding Comments

The primary audience for the suggested research would be education policymakers at the federal, state, and local levels, and thus it would be critical for the research program to include significant dissemination efforts. Further, the research would involve extensive data collection, and the data would need to be made available to policymakers in a succinct and intelligible form. To the extent that the research sheds light on the appropriate cooperative relationship between institutions in the private sector and public schools, the Center should be prepared to identify models of cooperation and to provide technical assistance to state and local officials who wish to implement those models.

The payoff of the suggested programmatic research would be to enable decisionmakers to make informed and purposeful decisions about practices, policies, and governance mechanisms that may be transferred from one sphere to the other, and to adopt a blend of procedures and policies that might best advance learning objectives. The research might also shed considerable light on how best to accommodate the needs of the private sector (economic growth, technological advancement, etc.) and the priorities of public education (equal educational opportunity, economic self-sufficiency, citizenship training, competency in essential skills, etc.). It would treat public and private schools, and public policymakers at different levels, as parts of an integrated education system, and seek to answer the difficult questions about allocation of scarce resources and accountability of those charged with educating the youth of the nation.

Most importantly, it would move education reform away from a focus on wishful thinking and anecdotes about successful and unsuccessful reform efforts and towards a focus on the concrete policy decisions that would need to be made to implement a reform agenda for education in the 1980's and beyond.

MISSION STATEMENT

TRANSLATING RESEARCH INTO EDUCATIONAL IMPROVEMENT

Mission Summary

This Center will study factors that facilitate or impede the interpretation, dissemination, understanding, acceptance, and use of educational research for the purposes of improving educational policy and practice. It shall do research on social, political, organizational, psychological, and communication factors that affect the transmission of research results to potential users and that influence their willingness and capacity to take research into account in their work.

Not so long ago, research was viewed as an effective avenue to educational reform. Confidence was high among legislators, administrators, research sponsors, and research performers that research would identify promising courses of action and that decisionmakers would apply them to enhance educational performance. That earlier faith is now eroding. Many people are skeptical about the payoffs from research. There is probably no more important undertaking for NIE as a research agency than (1) understanding the preconditions under which the premise of research-as-a-basis-for-educational-improvement actually holds and (2) building those understandings into more effective strategies for bringing research knowledge into the mainstream of educational decisionmaking.

The Center shall begin its program of research with a realistic understanding of what "using research" signifies in the complex worlds of educational policymaking and practice. It should not begin with expectations that research will supply "answers" that actors in educational systems should directly and instrumentally "apply" to "solve" the problems they face. As previous research has demonstrated, "using research" is a much more diffuse process than the traditional linear model (research → solution → application) suggests. At best, research provides concepts, generalizations, and data that open new lines of thinking, cast doubt on conventional assumptions, and help decisionmakers interpret and reinterpret past experience in their quest for innovative strategies of action.

The Center's program of research should take account of the fact that policymakers and practitioners have their own knowledge about the educational domain, which in many cases is as sound and rich as the knowledge that research supplies. The major issues have to do with ways to encourage <u>evaluation</u> of knowledge derived from both experience and research and an appropriate <u>merger</u> of the two streams of knowledge.

Another premise that should undergird the Center's research activities is that research is not the only external source of information and ideas pressing for attention. There are many other information sources in competition. For example, the vast array of educational interest groups, publishers of books and magazines, the mass media, advocates for special causes, and many other groups vie for influence on educational decisions. Therefore, research on issues of knowledge transfer should take into account the crowded channels of communication.

Moreover, the laws, regulations, budgets, norms, and standard operating procedures of the organizations within which educational actors work exert significant influence on what they do and do not attend to. Organizational incentive and reward structures are an important component of the knowledge transfer domain.

In short, research in this field must proceed from a sophisticated awareness of the sociopolitical complexity of the issues. Past research has revealed many of the problems. The task for the Center is to extend understanding of effective means for cultivating wiser use of research in educational choices.

Justification

Considerable research has been and is being done on significant educational issues, but the use of that research has been sporadic and erratic. A host of factors have been identified that intervene between the writing of a research report and its consideration in arenas of decison making. Among these are:

- limitations of the research (e.g., too narrow, not oriented to policy issues, of poor quality, faddish, arrives too late for decisions, inconsistent conclusions within a study, divergent findings across studies, findings based upon past rather than present or future conditions, presented in incomprehensible jargon, does not suggest courses of action, noncumulative)

- limitations of practitioners and decisionmakers (e.g., unwilling to take the time to listen or read, in a hurry, prefer to rely on their own experience, have fixed opinions, unfamilar and uncomfortable with research)

- limitations of organizations in which practice and policy takes place (e.g., fragmentation of responsibility, information overload, adherence to standard operating procedures, commitment to organizational ideology and "things as they are," frequent shifts in attention as new issues emerge, permeability to outside pressures, salience of the need to accommodate divergent interests, inadequate resources to attend to needs identified by research)

- limitations in communication links that transfer research knowlege to policymakers and practitioners (e.g., little synthesis of separate studies, inadequate interpretation, poor targeting to audiences, poor writing, lack of common concepts and language, insufficient personal contact with prospective users, competition with other sources of information, inadequate attention to training and technical assistance to help people apply research findings, insufficient development--the D in R&D--of research-based technologies, arrogance in assuming primacy of research over experience)

Some of these concerns are undoubtedly more pervasive than others; some apply only under very special circumstances. Nevertheless, for whatever constellation of reasons, experience shows that research has had only a modest influence on policy and practice in education. Much valid and important evidence goes unheeded. Policy mistakes are needlessly repeated. Early warnings of problems are not attended to. Inequities persist. Contributions that research can make to wisdom are lost.*

The losses are serious on many counts. Not least is the decline in support for funding educational research among political leaders and the public. But even more important is the loss of faith in research as an avenue to educational improvement among the people most directly involved, the people who make practice and policy decisions and the people who do the research. To stem the dwindling of hope for rational action based on valid and objective analysis, means must be found to improve the dissemination and consideration of research in decisionmaking at every level.

Past Research

Several dozen good empirical studies of knowledge dissemination and utilization have been conducted in recent years. They have extended our understanding of the processes by which research results influence policy and,

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*We do not intend to imply that all educational research is worth attending to. Much of it warrants neglect. But questions of how to plan a productive research agenda, select appropriate investigators, and conduct and manage research in ways that encourage both quality and utility are beyond the purview of the proposed Center.

to a lesser extent, influence classroom practice. They have revealed the ambiguities in the concept of "using" research and highlighted the complex routes to influence.

A frequent finding is that what decisionmakers are likely to hear about is not so much the specific results of a particular study as the ideas and generalizations from research. The ideas come to their attention not primarily through their own search activities or thorugh targeted dissemination efforts, but from a variety of informal channels, such as conversations, meetings, contacts with specialists in "issue networks," the specialized and mass media. When they learn about research ideas, generalizations, and results, they assess them against the standards of their own experience: Does the information make sense in light of what they already know?

Another common finding is that <u>applying</u> research results and ideas is a complex process which depends heavily on features of the organizational environment. On occasion, actors use research results to make and justify controversial decisions; the trappings of "objective science" bolster their position in the hurly-burly of organizational politics. At times, they consider the ideas from research primarily to question the direction of existing policy and program and to rethink what they are doing. Sometimes, it takes years before the ideas from research find an outlet--an occasion on which the opportunity arises to stake out a new course. Often the use of research is a <u>gradual</u> process, with research ideas slowly percolating into actors' awareness and gradually transforming their sense of how the world works and the alternative courses they might pursue.

Past research has also revealed the many occasions on which actors do not hear about relevant research. Only a small minority of policy actors, and probably fewer practitioners, engage in active search for research information. Many people fail to pay attention even to reports that arrive on their desks. However short, well-written, or timely they may be, research reports are usually of low priority compared to the immediate demands of the working day. Unless there are obvious and direct organizational incentives to respond to research findings, reports usually go to the bottom of the pile.

Some past studies on knowledge transfer have been informative. Many others, unfortunately, have been poorly conceived. For example, we now know that interviewing people about their "use" of research runs the risk of collecting a hodgepodge of unreliable data, with respondents interpreting "use" in a variety of disparate ways. Several good case studies on the transmission and use of research have been done. They have illuminated <u>contextual</u> factors that have been salient in the case, but it is not clear how generalizable the findings are to other contexts. A handful of laboratory experiments have been conducted to discern the effects of information on (simulated) decisions, but whether the results of these studies apply in real-world practice remains unclear.

Readership surveys, studies of attitude change, studies of organizational decision processes, analyses of organizational improvement efforts, evaluations of particular dissemination programs (e.g., R&D Exchange), historical reviews of changing directions in U.S. education--all have contributed pieces of relevant evidence of the subject of knowledge transfer. But by and large,

the results have been noncumulative. Each study examines a small patch, using its own definitions, variables, and research methods, so that putting together a coherent map of the territory defies even creative ingenuity. And the further—and essential—step is still in the future, namely, applying our emerging understanding of knowledge transfer processes to the development of effective strategies for communicating the results of good research to people in education who can benefit from them and devising mechanisms to encourage appropriate use of research among decisionmakers in key positions.

Plan of Action

Currently, there is little agreement among researchers who have been studying issues related to research dissemination on the parameters of the field, suitable approaches, or strategies of investigation. There is no consensus on the appropriate theoretical orientation or on specification of variables of significance.

Furthermore, there is no university that has a critical mass of relevant scholars. Relatively few people throughout the country have specialized in research on knowledge transfer, many fewer on knowledge transfer in education. And within the existing coterie, there are few people from disciplines such as organizational sociology, cognitive psychology, and communications who probably should be involved. There is probably no one institution that can at this time provide the resources needed for productive research in this area.

Accordingly, a network arrangement would appear highly promising. A "Center" should engage the efforts of scholars from a number of different institutions. How and by what administrative mechanisms such a de-centered Center would function remains to be worked out. But if good work is to be done, this seems to be the only way of bringing outstanding people on board on a continuing basis.

Given the disarray in the field and the number of unproductive studies that have already been done, a period of preparation is in order prior to the fielding of a set of major new studies. Such preparatory work might include: a series of meetings or conferences with specialists from different disciplines to try to reach agreement on the basic direction of the field; preparation of syntheses of existing research related to research dissemination and use; background papers on the orienting theories and constructs that shape research in different disciplinary traditions; critical review of strategies and methods of investigation that have been employed in studying the issue; identification of the most significant factors and variables that affect the several stages of knowledge transfer; identification of promising approaches for further study.

The scholars in the Center network should take the lead in managing the pre-research preparation. But they should have the liberty -- and the resources -- to commission work from people who do not want to maintain an ongoing commitment to research in the field. For example, they may want to ask a geographer to write a paper on the approaches geographers use to study the spatial diffusion of new practices or ask a political scientist to discuss the role of interest groups in the legislative process and the types of data and information that such groups use as a foundation for advocacy of positions.

After the network scholars have come to some agreements on fruitful research, they should work out an allocation of resources among themselves to pursue particular studies. They should also be able to receive proposals and fund research from researchers outside the network and be able to commission studies from outsiders, in order to be sure that the best qualified people are engaged in appropriate research.

The network should maintain a function of ongoing review and synthesis, and periodically revise their theories and definitions of the state of knowledge and appropriate next steps. The "Center," then, would be a mechanism for integration, support, and publication of research on knowledge dissemination and use. When the Center has developed information worth applying, it should work closely with NIE Labs to pilot-test new approaches.

One of the dangers of this proposal is that it will centralize research in this field in the hands of a relatively few people. Therefore, safeguards must be established to ensure that it does not become a closed corporation. The first safeguard will be the selection of researchers to paticipate in the network. The selection should be broad-gauged, including people who have already done good research on educational dissemination and use but also including people whose research has been outside of education and in collateral subject areas. An interdisciplinary mix is essential. So, too, is the representation of a diversity of approaches. The selection process is crucial.

Another safeguard must be the maintenance of openness to maverick viewpoints from scholars outside the network. There should be procedures to inform researchers throughout the country about the Center's work, encourage them to contribute ideas and critiques of Center plans and research studies, and mechanisms to support research unsolicited by the Center but recognized as promising for achievement of the Center's mission.

Funding

A system of variable funding seems necessary. In the first year or two, when most of the work will probably be synthesis, critique, and planning, a modest level of funding may be sufficient. In later years, new research studies will be undertaken, and the level of funding should increase. Funds will also be needed for publication and dissemination of the Center's reports.

Throughout the life of the Center, management is a critical function. Particularly with the kind of dispersed participation foreseen here, it is essential that the administrative staff be superbly qualified to maintain high levels of participation, on-time completion of tasks, and collective review and re-planning. Adequate support for the administrative function is essential.

Appendix I

Organizational Matters and Other Important "Loose Ends"

The Lab and Center Study Group for Education Policy has met for six days of intense deliberation and exchange of views. Many important points were raised that are not addressed in the mission statements or transmittal letter. These points cover both substantive and organizational issues.

- The Study Group recognizes that considerable research has already been conducted on various aspects of educational policy. However, much of this research has been divorced from the practical, everyday problems of educators. The mission statements that we submit to NIE have been guided by one overriding question: In what ways does policy enhance or detract from student learning and effective teaching? And second, what research can most usefully improve our understanding of the consequences of policy for teaching, student performance, and other fundamental educational objectives?

- Other Study Groups will submit mission statements that directly address issues of student learning and classroom behavior. We regard these topics as the single most important ones for educational research, though unfortunately, outside the scope of our Study Group.

- It is not clear that there exists a single best way to organize research centers. In the end, the effectiveness of the research center depends on its ability to attract first-rate researchers willing to work

together in pursuit of common interests. This is not always best accomplished through a large concentrated research center staffed primarily with full-time employees. Instead, we strongly urge the National Institute of Education to consider proposals which consist primarily of more dispersed networks of researchers in various parts of the country, or centers of smaller scale than has been the tradition. By entertaining a variety of organizational approaches, the Institute might conduct its own natural experiment with different ways of organizing research centers.

- We urge the Institute to create centers in which the research is truly cross-disciplinary. Researchers from varied disciplines, pursuing their individual interests under the guise of a center, will not produce the new perspectives necessary to address pressing educational problems.

- Much of the research undertaken in the past is seriously limited by the availability of suitable data. We urge the NIE to undertake a thorough review of data required to advance educational research.

- We have recommended a center mission on policy and school personnel. This mission statement deals with the policy issues surrounding recruitment, retention, pay, and professional development of competent and effective school teachers and administrators. It does not address other important aspects of teacher preparation, notably teacher training, retraining, evaluation, and classroom behavior. These topics are not within the purview of the Policy Study Group, and we understand they are being addressed in the mission

statements of other groups. We believe it might be desirable to include both perspectives--policy and professional development--in the mission of a single center.

Likewise, one of our mission statements is "Policy on Education and Employment." Where this overlaps with a mission statement of another Study Group, we recommend that you consider merging both statements.

- The Study Group discussed the topic of education technology at length, but did not recommend a mission statement. This topic is addressed more fully in Appendix II.

APPENDIX II

Technology and Education

The Center Study Group for Education Policy is vitally concerned with exploring the uses of advanced technology to improve student learning and school management. We urge the NIE to pursue research and related activities in this area. This research has great potential for increasing educational efficiency and effectiveness.

Since NIE is currently conducting a competition that will result in funding for a center on education technology, we have not recommended a specific mission statement in this area. The issues of interest to the Study Group significantly overlap with those in the technology RFP. Instead, we attach two papers for consideration by Institute staff and the soon-to-be formed center on technology. One paper, "The Transfer of Knowledge," has been prepared by the Study Group, and the second paper, "Why Will The Computer Become the Dominant Educational Delivery System," is authored by Professor Alfred Bork.

THE TRANSFER OF KNOWLEDGE

Introduction

"Where is public education going?" is a difficult question to answer because among educators it invokes images of where they believe its place should be in our society. Far too many parents, students, and members of the "non-educational" society are critical of where it is and pessimistic as to where it's going. Some, who benefited from a previous educational experience and no longer need its service wish it would just stop draining scarce resources and vanish.

It does appear, however, that public education is drawing attention from business and political leaders and that the importance of public schools in the nation's future is clearly understood. Increasingly, public education is seen as necessary to the nation's economic productivity. Perhaps the most concentrated focus has come from the business community who need better educated and trained employees now and in the future. As demands for improvement grow, it becomes more important for the established institutions to redesign their education "factory" and develop new missions to train and educate students for jobs and careers related to high technology as well as for surviving in an information age. Perhaps, as never before in our nation's history has so much been said and written about the development of stronger ties between industry and education.

Each presenter has a different agenda -- industry needs and the educator's are often seen differently. In its report, "America's Competitive Challenge: The Need for a National Response," the Business-Higher Education Forum urged: "As a nation, we must develop a consensus that industrial competitiveness is crucial to our social and economic well-being." This statement addresses a set of global issues that have a direct impact upon our nation's economic survival -- this Forum urged that each segment of society -- business, education, labor, and government "...perform those parts of the overall effort for which it is best suited and to enter into new cooperative alliances when necessary." Whereas, many educational leaders see the set of new conditions as a means to obtain additional taxpayer support to continue a "business as usual" approach to the business of education.

Where is the National Institute of Education? As part of the U.S. Department of Education, it must be attentive to the role of the Department and serve as its research arm. The comprehensive Education for Economic Security Act (S.1285) will no doubt direct a substantial appropriation toward improving secondary education in mathematics, science, and engineering; however, if passed, the compromise bill would channel the largest share of the appropriation to the Department for delivery to school district. Programs involving the retraining of existing teachers, the development of new ones, fellowships for students, equipment, and various incentives for educational improvement, including the establishment of state standards of quality will be in the making. Are state and local school districts prepared to accept this challenge? Is the National Institute of Education ready to provide advice,

counsel, direction, and general assistance as the "paper programs" are created in order to obtain the federal dollar? What will the industrial community anticipate? It will, I expect, envision a well designed program to accelerate education/training to create the better trained, highly motivated and self-disciplined labor force that will be needed as the economy continues to shift from an industrial to a high technology base. The private sector would recognize such an approach as the link that connects the school and the real world of work and thus improve the prospects for investment because a return on the investment would be evident. On the other hand, an increased expenditure without evidence of improvement or responsible direction would be disappointing and create more serious issues for public education to face. It will be a real challenge and require a breed of courageous men and women to assume the educational leadership roles. It is not difficult to leap upon the popular bandwagon of high technology; however, as Stanford University's Michael Kirst cautioned at a recent ALPS seminar -- "...we don't really know where technology is going. We should look carefully at the number of new technological jobs, not their percentage of increase. We should also examine the skills needed for these jobs - they may not be as high as we think."

Kirst's advice should not be minimized. The marketplace is unpredictable and the consumer demands dictate the product and service requirements. Unlike public schools, changes in industrial direction are swift because the stockholders and stakeholders demand a continuous return of investment that necessitates the capture of a reasonable portion of a market. In order to accomplish this, industry must present the highest quality product at a price

acceptable to the consumer. Without sound planning and the proper use of information obtained from appropriate sources, the educational manager might forget the fundamental purpose of education and become subservient to the labor/production task.

There is a great deal of activity in progress that touches upon the role of public education in the world of high technology as well as local school district involvement in the selection of hardware and software products. Since computers are information-processing machines that accept, store, manipulate, and display information, it appears reasonable to assume that such devices can support or improve upon what people do in school settings. Therefore, in an attempt to offer evidence of educational improvement, school managers look to the computer-based instruction potential, and the number of machines in house has become a measure of a "good school." This is questionable.

The transfer of knowledge is a function of the public schools, and the NIE should pursue all aspects of high-technology delivery systems that would support that function. In the NIE's Statement of Goals and Priorities, the Director listed six of the nine established by the Secretary, T. H. Bell, as applicable to the NIE program. The aforementioned systems can serve all six.

In his paper, The Fourth Revolution - Computers and Learning (University of Oregon - June 1982), Dr. Alfred Bork, University of California at Irvine, presents what, in my opinion, is the best approach to a complicated topic.

Dr. Bork challenges the imagination as he touches upon those critical issues in education. The following is his introduction; the entire paper is attached.

> "The theme of this paper is that we are on the verge of a major change in the way people learn. This change, driven by the personal computer, will affect all levels of education from earliest childhood through adult education. It will affect most subject areas and most learners. It will affect both education and training. It will be one of the few major historical changes in the way people learn. The impact of the computer in education will not produce an incremental change, a minor aberration on the current ways of learning, but will lead to entirely different learning systems.
>
> This massive change in education will occur over the next 20 years. Schools, if they exist at all, will be very different at the end of that period. There will be fewer teachers, and the role of the teacher will be different from the role of teacher in our current educational delivery system. I use "schools" throughout this paper in the general sense to include any formal schooling activity, whether it be the third grade or the university, or any other level; for emphasis, I sometimes mention particular types of schools.
>
> I hasten to say that this change will not necessarily be a desirable change. Any powerful technology carries within it the seeds of good and evil, and that applies to an educational technology. One of my major goals in making presentations of this kind is to nudge us toward a more desirable educational future rather than a less desirable educational future. Our efforts in the next few years are particularly critical for education.
>
> The full, long-range implications of the computer in our world of learning are seldom discussed. Indeed, people are often overwhelmed by the technology, delighted with each new toy which they receive. Yet these implications must be considered if we are to move toward an improvement in our entire educational system.
>
> The strategy of this paper will be to first look at the "why," then to look at the "how," and then to return to present action. Many of the issues are discussed in more detail in my recent book, Learning with Computers."

At present, there is little evidence available that might weaken Bork's projection about the impact of the computer on learning systems. Rather, the surge of high-technology transfer of information is just beginning. Computer-aided design and manufacturing is popular even before the systems leave the infancy stage of development, and the robotics research will in time bring about major changes in our labor intensive tasks -- both blue- and white-collar jobs will be affected.

The Transfer of Knowledge is a major policy issue that must be addressed by the NIE. If the taxpayer supported Regional Educational Laboratories and the R&D Centers cannot respond to this development, changes should be made. High technology and computer science is accepted as part of the modern day curriculum -- now it is time to recognize the value of these modern-day innovations as part of the education/training delivery system.

In its simplest form, the following is submitted for review:

TRANSFER OF KNOWLEDGE

Definition:

A policy decision by the National Institute of Education to initiate a program of research on the available high-technology information systems and focus upon the appropriate application to increase the educational teaching quality and capacity.

Justification:

The computer applications touch every member of our society, and the wide range of benefits are convincing the majority of the population that this technology has a purpose in our daily lives.

- medical advances that include life-saving systems
- rapid transmission of the information flow
- office automation of every description
- industrial manufacturing and advanced robotics
- military systems
- entertainment
- food production and processing

How Policy Influences:

Education is facing a host of challenges that range from increasing the knowledge base to reducing the personnel included in the current delivery system. Issues of this magnitude should be addressed from a solid policy position by the National Institute of Education. Such a policy would be the keystone necessary to connect, bridge, and hold together the multitude of unilateral efforts underway by school districts deserving of attention.

- develop long-range plans for computer use
- specifications to meet short- and long-range objectives
- allocation of personnel, tasks, and salary/wage scales
- management responsibilities for equipment, training, and collection of progress assessment information for NIE use in establising reliable data base and analysis
- cross-district collaboration on technical innovations
- national or regional program opportunities availability to small schools, rural or urban, that have difficulty in attracting and retaining sufficient qualified instructors
- develop projects to reduce travel time of specialized personnel
- introduce opportunities for structured, independent, or group learning

Researchable Issues:

NIE should commission a team to examine the available technology and introduce technology representatives to defined educational problems that require attention. Permit the high-tech designers to become acquainted with the educational world as it exists and solicit

recommendations that might bring about improvements through the introduction of a transfer of knowledge system.

- specialized programs, lectures, laboratory experiments, library support, team teaching, counseling, inservice training.

The NIE effort should include the second phase that introduces selected educational managers to the high technology systems available, and they should search for new opportunities.

Pilots might be established, or RFP's solicited by NIE to create a well-defined plan to research the programs underway and draw conclusions as to the merits of the activities. The ultimate purpose of the research would be to establish the various alternatives and their combinations in the use of sophisticated systems to accomplish educational objectives; and the outcomes would add to the body of educational knowledge about teaching, learning and improving educational performance.

Alfred Bork
University of California
at Irvine

WHY WILL THE COMPUTER BECOME THE DOMINANT EDUCATIONAL DELIVERY SYSTEM?

In making a brief case as to why the change I am suggesting will take place, I first look briefly at educational factors in modern society. Then I will consider aspects directly related to the computer.

Current Status of Education

First, it does not take any great effort to see that our educational system is currently in trouble. We are being told this constantly from all sides. The daily newspapers, the popular magazines, and recent books are full of descriptions of the problems of our current educational systems. One can even measure these to some extent by declining SAT scores, declining steadily until last year, and similar results from the National Assessment tests.

Independent of statistics, however, the most interesting and critical information is the decline in faith in education in the United States. We can see this very heavily reflected among politicians at all levels. At one time for a politician to speak out against education was suicidal. Now we find that it is often politically effective. Indeed, our current president campaigned on the notion that we didn't need a Department of Education, although so far he hasn't abolished it. But he did abolish the entire science education division within the National Science Foundation, simply by cutting its budget effectively to zero. The politicians know that education has little support in American society and that, indeed, it is politically expedient to cut educational funds. Education has few defenders and many detractors.

I do not wish to imply that these problems with education are simply a matter of public relations. Indeed education has very real problems in this country and elsewhere. In the whole history of the American educational system there has seldom been a time when there was greater turmoil and where the status of teaching, in both the public schools and universities, has been lower than it is now.

All indications point to the fact that this decline in popular support of our educational system will continue. Few positive factors other than interest in the computer can be pointed to.

Coupled with this declining appreciation of education, perhaps even a consequence, is a factor which affects education even more directly, the factor of increasing financial constraints. The schools do not raise enough money to run an adequate educational system in this country today. Any adequate science or mathematics teacher can make far more money outside of the schools and universities than that individual can make within

types is rapidly dropping in price.

The integrated circuit technology is only at its beginning, and we can expect a long steady decline in prices, increase in capabilities, and decrease in size. Going along with this will be increased educational capabilities, such as sound (both in and out), much better graphics, alternate media, such as those provided by the videodisc, and a host of other rapid developments. In planning for computers in education we must give full attention to this dynamic situation rather than focusing on today's hardware.

Technology is not learning. We can be too carried away with the technology and become interested in it to the exclusion of learning! So we should not give primary attention in education to the new hardware developments. The real interest in the computer in learning lies not in its decreasing price and increasing capabilities, obvious to all, but rather to its effectiveness as a learning device.

How does one demonstrate this effectiveness? In education the traditional mode of experiment has seldom proved to be satisfactory. Neither the financial resources nor the number of subjects are adequate in most existing educational research. The difficulties have to do with the many variables which cannot be controlled, so different from the experimental situations that were typical of the physical sciences. Few large-scale experiments have proceeded with the computer, and these were often flawed. Further, our skills in developing materials have advanced, and many of the studies are based on minimal early material. We can find lists of research projects that supposedly do or don't demonstrate that the computer is good in learning, but I am singularly unimpressed with most of these studies when I examine them closely.

So the use of adequate comparison studies in demonstrating that computers are useful in education is seldom practical. All is not lost, however, in demonstrating effectiveness for users. One important way to do this, very convincing in many situations, is to look at some examples of what is possible and to point out the features of those examples which lead to the computer becoming generally very effective in learning. It is this approach we will follow here. Another approach is through peer evaluation, the examination of materials by pedagogical experts in the area involved.

Educational Technology Center Projects

I will describe in this section three projects in computer based learning from the Educational Technology Center. The first used a timesharing system; the others, more recent, were developed directly on personal comptuers.

The first project is a beginning quarter of a college based

student is always active. The computer may enable us to get back to a much more humanistic, a much more friendly, educational system by making all of our learners participants rather than the spectators they frequently are in our present book- and lecture-learning environments.

The second advantage offered by the computer is individualization of the process of learning. Everyone says that students are different, that each student is unique, that each student learns in different ways. But most of our standard learning procedures, such as the lecture, are very weak in allowing for these individual differences. They typically treat most students in the same way. For example, if a student in a particular point in a course lecture is lacking some important background information, that student is swept along in our traditional courses with everyone else in the class. The missing information is hard to acquire under those circumstances. The rational procedure would be to allow the student needing special help to stop the major flow of learning at that point and to go back and pick up the background information. But most of our present structures for learning have no adequate provisions for such a possibility. The actual needs vary between what can be learned in a few minutes and what can be learned in a whole course.

With the computer the situation is entirely different. Each student can move at a pace best for that student. Each student will be responding frequently to questions. (We have found in our recent programs that a student responds about every fifteen seconds). So the computer, with curriculum material prepared by excellent teachers, can determine what the student understands or does not understand at a given point. Remedial aid can be given where appropriate, simply as part of the flow of the material with no break from the student point of view. Indeed, the student, using well-prepared computer based learning material, does not have the impression that any "special" treatment is taking place, so no psychological stigma is attached to such aid. With the individualization possible with computers, one can hope to achieve the goal of mastery learning, where everyone learns all material essentially perfectly.

So much for "why" computers are going to become the dominant educational delivery system. The two factors mentioned, the unpleasant situation in education today and the usefulness of the computer as a way of learning particularly in dealing with large numbers of students, suggest to me that the computer will move rapidly forward in education. But we still must look at the other side of the question, the "how" of the development. That is, how do we move from our present situation, where computers are little used in learning, to a situation in which they are the dominant delivery system? This is the subject of the next section.

HOW WILL WE MOVE TO MUCH GREATER COMPUTER USE?

own, is enormous. The home will be the driving force for education too, since the commercial pressures for home sales will be very great.

In a sense, education is never "first" with computers. For many years we piggybacked on essentially a business or scientific technology in computers with education only a poor follower. The new situation will be similar, but with the home market the dominant one.

To sell computers for the home, it will be necessary that they do something. The average home owner is not going to buy a computer on the grounds that they are currently being sold to homes, primarily for hobbyists. The home user of equipment buys an appliance, a device such as a refrigerator or stove that accomplishes some task or tasks. They don't buy a gadget that they can put together in various ways to accomplish different types of tasks! The size of the home market will depend on the skill of vendors in convincing people that the computer in the home will be useful to the average person. Some estimates have suggested sixty million computers in homes in ten years.

I do not wish to imply that a single appliance-like use of the computer will drive the home market. On the contrary, a variety of such uses are likely to be important. Home word processing, for example, will be an extremely important use. Home financial systems, complete enough to keep all the financial records and write the income tax when asked to, and to aid in home financial decisions, will also be of importance. Personal record keeping systems, including class notes, lists, and similar uses, are also likely to be of major use in the home. Finally, educational material will be one of the types of material that without question will drive the home market. The size of this market will depend on the quality and quantity of such appliance-like programs.

Thus, we will find learning material based on the computer being developed for home computers, in some cases almost independently of whether it will also be usable in elementary and secondary schools, university, or other learning environments. Schools will use the material developed primarily for education in the home even though it may not be ideally suited. It may be that this material will often have more careful thought put into it than some of the earlier products developed particularly for the school environment, simply because the potential market is so much larger and users more discriminating. Schools are already desperately searching for computer based learning material and are finding that little good material is available.

The people who are using the new learning materials in the home will be coming to our schools and universities. They will already have become accustomed to interactive learning, and more and more they will demand it in educational institutions. If the educational institutions wish to survive, they will provide it.

the newer companies will have no need for this, and so may be open to more adventuresome activities. Some of the companies will be selling to a combination of the home and school market. In general the materials developed for the home market will be available in the school market too.

Schools

Given the turmoil and financial restraints in the schools, the commercial pressures, the pressures created by the home market, and the increasing effectiveness of the computer as a learning device, more and more schools will turn to computers for delivery of learning material. Indeed, we can already spot this happening, although in a minor way.

One interesting sign is the fact that many schools, particularly small schools, no longer have adequately prepared teachers to teach many of the important courses in the curriculum. Thus if we look at high school courses such as trigonometry, advanced mathematics, and science courses, rural schools in the United States presently are often not providing these capabilities, at least not in a way that is competitive with the better large urban schools. Computers will be a mechanism for equalizing opportunity for students by providing computer based learning courses in these declining areas, courses that otherwise would not be available. Hopefully, these courses will be developed by the best individuals from all over the country.

We may see a decreased role of the formal school and the formal university in our educational system. Much education will be able to take place in the home in a flexible fashion. At the university level we already see one outstanding example of a development of this kind, The Open University in the United Kingdom, but still with relatively little use of computers. The Open University has demonstrated that good curriculum material in home environments can be effective as a learning mode and economical as compared with the standard cost of education. Voucher systems, if they are enacted, will make home learning much more likely.

I do not wish to imply that all education will move to the home. Indeed, a view of the educational system such as that shown in George Leonard's book, Education and Ecstasy, suggests that the sociological components, the factors associated with living with other people and living with oneself, will still probably best take place in small group environments within schools. But many of the knowledge-based components of learning may move to the home.

Types of Usage

We have discussed very little about the way computers will be used within the school system. Something needs to be said about this, if only to counteract some of the current propaganda.

All these courses need to consider such important future uses as word processing, personal financial and record keeping systems, and eductional material.

Learning to Program. Learning to program is already a rapidly increasing activity in our universities and schools. It represents in grade six through twelve the most common usage of computers at the present time. Unfortunately, where it happens at this level it is often a disaster, harming more than helping the student.

The major problem is the way programming is taught. A whole group of people is being taught a set of techniques which are no longer adequate to the programming art today. These techniques were common in the early days of computing, but they are inadequate according to today's standards. Many of the people learning to program in junior high school and high school cannot overcome the initial bad habits which have often been instilled in them when they come to the universities. Many universities are now reporting this phenomenon.

The main culprit is BASIC. It is not that BASIC has to be taught in a way that is antithetical to everything we know about programming today. But it almost inevitably is taught in such a fashion. BASIC is the junk food of modern programming. Indeed, the analogy is close in that junk food tends to destroy the body's desire for better types of food. But the analogy is weak in one regard: BASIC is the initial language of the vast majority of these people. It is as if you started feeding junk food to babies one day old and didn't give them anything else until they were six! If I could leave you with one message, perhaps the most pressing message, it is to STOP TEACHING BASIC. It is becoming clear that students who learn BASIC as their first computer language will in almost all cases acquire a set of bad programming habits. These habits are very difficult to overcome, so BASIC programmers have difficulty writing readable and maintainable code.

The following recent comment by a disntinguished computer scientist, Edgar Dijkstra, is relevant:

> "It is practically impossible to teach good programming to students that have a prior exposure to BASIC: as potential programmers they are mentally mutilated beyond hope of regeneration."[8]

What programming languages should we teach? There are a number of possibilities for junior high and high schools. Logo is certainly one interesting possibility, although I must confess that some features of Logo are different from those recommended in the best modern programming practices. Logo, however, is introduced in a problem solving environment, and that is very much to its advantage. Often its main intent is presented not to teach programming but to teach more general problem solving capabilities

tend to underrate these problems of developing effective learning material. Hence, some of the solutions which have been proposed are solutions which are simply not adequate to the problems. Some of these solutions assume only small incremental changes in the curriculum structure and do not understand the magnitude of the development necesary.

We cannot discuss fully in this paper all the aspects of the production process. The Educational Technology Center has extensive literature available concerning these issues for those interested.

Several critical points concerning products should be made to give the reader a reasonable overall viewpoint. The production system is a complex system, one that should involve many types of people with many different skills. If one looks at the production of any educational material, one sees that that is the case. We can learn much by examining effective curriculum production systems, such as that currently in use in The Open University, that used in producing the major curriculum efforts in the United States more than ten years ago, and that involved in such areas as the development of textbooks.

What we need to resist is the notion that one person, perhaps a teacher in his or her spare time, will do it all. I do not believe that any sizable amount of good curriculum material will be produced by this method. Furthermore, I do not believe that the devices which are being urged for these teachers, such as simple-minded authoring systems based on toy languages (Pilot) will be effective. Nor do I think that languages such as Tutor will be effective, because they do not meet the reasonable criteria associated with modern programming languages. Most of these languages are old in their design, and few of them understand the nature of structured programming. A serious professional approach is needed if we are to maintain the quality of the computer based learning materials produced.

We can see a number of stages needed in such a professional approach, listed below.

a) Preplanning
b) Establishing goals, objectives, and rough outlines
c) Specifying the materials pedagogically
d) Reviewing and revising this specification
e) Designing the spatial and temporal appearance of the material
f) Designing the code
g) Coding
h) Testing in-house
i) Revising
j) Field testing
k) Revising

The last two stages may be repeated twice.

modern structured languages.

4. Listen to students. In your own teaching, begin to move away from the lecture mode presentation into a more Socratic mode. A critical factor is listening to what students say and watching what they do. This means that when you ask questions, you have to wait for answers! It also means working more individually with students in groups of two to four. It is only by this procedure that you will begin to build up the insights you need for how students actually behave when they are learning.

People whose primary mode of interaction with students is through the lecture mode or through textbooks are seldom the best choices for preparing computer based learning material. The development of computer based learning material will need vast numbers of experienced teachers, teachers who have been listening to their students and who understand student learning problems.

5. Personal computers. Begin to use a variety of personal computers, with particular emphasis on the new generation of 16 bit machines. Read the journals that tell you about new equipment. Watch for voice input, better graphics, and full multimedia capabilities.

6. Critical attitude. Look at a good bit of computer based learning material, trying to develop a critical attitude toward it. Don't be overwhelmed simply because it is interactive or because the computer is involved. Keep your mind on the learning issues and learn to develop some sensitivity as to what existing material helps learning and what doesn't.

Most existing material is poor. Find out why. Read the journals that specialize in critical reviews.

7. Work with others. The development of good computer based learning material is best done in a group. Work with others in discussing goals, strategy, and the details of design.

8. Future orientation. Concentrate on the long-range situation, not today or tomorrow. Decisions which are "good" from a short-range point of view may be undesirable in the long range to both you and to the future of our entire educational system. So keep the long-range point of view strongly in mind.

9. Visions. Begin to think about what type of future educational system would be both desirable and possible. If you want to influence the future, you must have visions.

> "Developing quality computer-assisted instruction demands forethought; those of you who are unfortunately caught up in expedient movements in education need to take a closer, more courageous look at the nature of the hope on Pandora's chip. You're dealing with as powerful a tool as the gods have ever given us."[9]