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ABSTRACT

There is a need for improved educational indicators in order to determine the nature of the major problems facing American education. Based on the experience of the National Commission for Excellence in Education, this paper tries to provide the basis for identifying a preliminary set of indicators that would be useful to policymakers and that are not currently available. In the input stage of the educational system the indicators would be: amount of time allocated to education, content, standards and expectations, teaching as a practice and as a profession, and leadership and support. Factors identified in the output stage are achievement and retention. There are certain kinds of information which are essential for defining variables but not available, such as: number of students who know basic academic concepts, achievement of students compared to students in other countries, ability of students to solve complex problems, trends in measuring educational achievements, and trends in achievement facing different challenges. Reasons are offered to explain why some of the indicators are not available. (JAZ)

June, 1985

"Educational Indicators: What Do We Need to Know That We Don't Know Now?"

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When the National Commission on Excellence in Education prepared its report, A Nation At Risk, it was concerned very much with educational indicators. The Commission was charged, in part, with determining the nature of the major problems facing American education. To do this, the Commission needed to examine the evidence that was available of the health of the country's educational system. The products of this effort are two sections in particular in A Nation At Risk: a section called "Indicators of the Risk," which is a compendium of the major pieces of evidence the Commission found concerning the quality of American education; and sections of "Findings" in the areas under which the Commission organized its analysis and recommendations--time, content, expectations, teaching, and leadership.

The figures cited in these sections encompass student achievement in basic skills and academic subjects, rates of functional illiteracy, trends in the amount of homework assigned to students, figures on average teacher salaries, comparisons of the time spent in school by U.S. students with the time spent by their counterparts in other countries, and so on, but the Commission's experience revealed perhaps as much about the inadequacy of our educational indicators as it did about the inadequacy of our educational programs. The "Findings" and "Indicators of the Risk" cited by the Commission were the best evidence available on important aspects of our educational system, but there was much more information that should have been included in these sections that simply was not available. The Commission could say nothing, for example, about the general skill of American teachers in presenting subject matter and conducting lessons. No figures were available to indicate whether functional illiteracy was increasing or decreasing over time. Comparisons of the achievement of U.S. students with that of students in other countries was fifteen years old for some subject areas. Finally, detailed information about what high school students actually studied and knew in subjects like science, social studies, mathematics, literature, and the humanities had never been collected or reported on a nationally-representative sample.

At least one indicator--the courses typically taken by high school students during their four years in high school--was felt to be so important that the Commission arranged for its collection, having found it was not available from any other source. The resulting

study revealed that students took alarmingly few courses in the academic subjects. This finding led the Commission to recommend that a minimum number of courses be required in the academic "basics"--English, science, social studies, and mathematics, as well as computer science and (for the college bound) foreign languages--in order for students to be granted high school diplomas, and over the past 3 or 4 years, most states have increased these course requirements. This experience underscores the importance of this information, a level of importance which is not consistent with the inattention that this particular piece of information has been given among our educational data-collection activities.

Significant efforts are underway to improve our educational indicators. The Department of Education initiated an "indicators" project that has, thus far, provided a useful taxonomy for educational indicators and a description or compendium of twenty of the key indicators in this taxonomy that are currently available. A periodic report of these key indicators was initiated by NCES in 1985. (Indicators, 1985) The Department also initiated a one-sheet chart displaying key educational information for each of the states. (U.S. Department of Education, 1984, 1985) The Chief State School Officers as a group have endorsed (and taken the initiative for compiling) educational assessment data, including school outcome data, on a state-by-state basis, and the National Assessment of Educational Progress has taken steps to enable states to piggy-back on the National Assessment to collect state-by-state achievement data for purposes of self-monitoring and comparison.

Despite these efforts, a crucial step remains to be taken. This step is to consider systematically the information that we need but do not have about education, identifying and planning those indicators that should be added to, or improved among, our current set.

What I will attempt to do in the remainder of this paper is to establish a framework for organizing and considering educational indicators, review which of the indicators in this framework are currently available, and identify some of the important indicators that, based on the experience of the Commission on Excellence, are not available.

A Framework for Educational Indicators

The concept of an educational indicator involves two elements. Each of these has been addressed by other analysts, but they have not generally been considered together. First, an indicator describes a variable in the educational system or educational process. The National Commission on Excellence in Education organized these variables under an input-output model, with an emphasis on the inputs of education:

Figure 1

Framework for Variables in Education Used By
The National Commission on Excellence in Education*

I N P U T S					O U T P U T S	
Time	Content	Standards & Expectations	Teaching	Leadership & Support	Achievement	Retention
Days /yr; Hrs/ day; Use of time	Courses taken; Curric. content	Grades; Test scores for promotion; Rigor of materials; Stds for admission; Homework assigned	Salaries; Size of work-force; Aptitude scores; Rewards for per-formance	Fiscal support; Community initiatives	Test scores; NAEP results Int'l com-parisons	Drop-out rates; Levels of at-tainment

*The variables shown are intended to illustrate the categories in this framework; they are not necessarily all of the variables considered by NCEE.

The Education Department's Indicators Project uses a similar scheme, describing education as a process, but it classifies the indicators under "outcomes," "resources," and the "context of education," or those factors such as instructional climate and parent support that have an effect on the success of the educational process.

These schemes are alternatives that attempt to serve the same purpose: to model the educational process or system. One must decide if the models are interchangeable or whether they differ, and, if they differ, whether one of them is more valid, comprehensive, or parsimonious than the others.

The second element involved in the idea of an educational indicator is the purpose to which the indicator is applied (Selden, 1984; and Smith, 1984). As we have pointed out, indicators can be compared to absolute standards of how we want the educational system to perform. They can be used to compare the performance of our system with the performance of other systems. Or, they can be used to see how our system is doing in relation to how it has performed in the past. The Commission looked at evidence of the quality of American education by comparing it in some cases to absolute standards (23 million illiterate adults is more than we should accept in this society); by comparing it with similar evidence pertaining to education in other countries (twelfth graders in the U.S. do fair to poorly in mathematics when ranked among twelfth graders from developed countries); or by comparing it with evidence of how we have done in the past (17-year-olds are less able to draw inferences from their reading now than they were in 1970). These are the three major types of analysis that can be made with an educational indicator.

Smith explains these functions quite ably and how they turn simple variables about education into indicators which are useful for setting policy. He also points out that indicators can be analyzed in conjunction with one another to explore how the educational system works (and how policy decisions might affect it). For example, while the aptitude of students entering teacher-preparation programs has declined, so have average teacher salaries, in real dollars, suggesting that there may be a relationship between these trends.

Given these two notions essential to the concept of an educational indicator (the features of the educational system that they describe, and the purposes for which they are examined), one is tempted to array indicators in a matrix:

Figure 2

Matrix of Educational Variables and
The Purposes to Which They Can be Put As Indicators

	E D U C A T I O N A L S Y S T E M	
P U R P O S E S	I n p u t s	O u t p u t s
Comparison with a standard	XXX	XXX
Comparison with another system	XXX	XXX
Comparison with past performance	XXX	XXX
Analysis of how the system works	XXX	XXX

In this matrix, each characteristic of the educational system could be reviewed for any or all of the four purposes shown, and any type of comparison or analysis could be made on any of the characteristics of the system. In real practice, it would not be useful or appropriate to make all of these analyses. Some of the inputs and outputs of the educational system have no inherent, absolute standards associated with them, or they may have no standard to which we would all agree. In these cases, reference to other systems or to past performance may be the only reasonable basis for interpreting the indicator. Examples of this situation might be indicators of the ability of teachers to present lessons before a classroom, or the fiscal effort communities put forth to pay for their schools. In these cases, we really have no basis for deciding the level on the indicator that is desireable or acceptable. In other cases, we may have set absolute goals for the U.S. educational system that are one-time efforts, or that are unique to the U.S. system and do not pertain to other systems, such as extending education to the disadvantaged over a certain period of time. In these cases, we would concentrate on our attainment of the goal and would not (perhaps could not) review progress in relation to past performance or to other countries.

With these caveats in mind, one can imagine a list of variables, and purposes to which they can be interpreted, that would constitute a comprehensive and "idealized" list of educational indicators. The question before us is: Among the most important indicators in such a list, which ones are available to us and which ones are not?

Educational Indicators--What Do We Know and Not Know?

The experience of the National Commission on Excellence in Education gives us a basis for identifying a preliminary set of some of the indicators that would be useful to policy makers, and that are not now available. To do this, let us go through the taxonomy of indicators that the Commission considered, to identify at least some of the analyses that I feel the Commission was not able to make, because the necessary data did not seem to be available or useful.

INPUTS

1. Time--The amount of time allocted to education, and the use of the time allocated by teachers and students.

What the Commission reported concerning time:

° That, in the U.S., the typical school year is 180 days and the typical high school day is 6 hours, compared with England and other industrialized countries, where it is not unusual for high school students to spend 8 hours per day, 220 days per year in school. (A Nation At Risk, page 21)

° That, out of 30 hours of student attendance in school each week, the average school provides 22 hours of academic instruction, and some schools provide only 17 hours. (Risk, page 22)

° That, because of differences among teachers in their ability to manage classroom time, some students may receive only one-fifth the instruction in reading comprehension that is provided to other students. (Risk, page 22)

° That, in most schools, students are not taught how to manage their time, through planned and systematic instruction in study skills. (Risk, page 22)

° And that students in the U.S. are asked to spend too little time on homework, and the time they spend on it has declined. (Risk, page 19)

What the Commission could not report...

...concerning the volume of time allocated to schooling:

° How much states and local school districts vary in the length of the school day or school year: for example, how many districts provide five, six, or seven hours of attendance per day, or what proportion of districts offer more or fewer than 180 days of instruction per year?

° Whether the length of the typical school day or school year has been increasing or decreasing over time in this country.

...concerning the use of time by teachers and students:

° Whether (and how much) schools around the country, at both the elementary and secondary levels, vary in the proportion of allocated time that they actually schedule for academic instruction.

° How U.S. schools compare with schools in other countries in the proportion of allocated time that they schedule for academic instruction.

° How U.S. teachers compare with teachers in other countries in their ability to manage classroom time.

° Whether teachers have become more or less proficient over the years in their ability to engage students in academic learning.

° Whether students in other countries are taught work habits and study skills better than students are taught these skills in this country.

° How much variation exists in the teaching of study skills among schools in this country, and whether the variation is systematically related to characteristics of the schools. (Do certain types of schools provide this kind of instruction?)

° And, how U.S. students compare with students in other countries in how much homework they are required to do.

2. Content--the courses taken by students, or the subject matter presented to students, and the substance learned in these courses.

What the Commission reported concerning content:

° That high school students have migrated to the general track from vocational and college-prep programs, resulting in a lack of focus in their curricula. (Risk, page 18)

° That few high school students were taking courses in such subjects as advanced math, foreign languages, or geography, even though these courses have been offered to them, generally.* (Risk, page 18)

° And that too many of the credits being earned by high school students have been in courses in health and physical education, out-of-school work experience, remediation, and courses aimed at personal service or development, such as training for adulthood and marriage.* (Risk, page 18-19)

(The Commission addressed the courses taken by high school students under two areas--under "Content," concerning the nature of the coursework students take or do not take, and under "Standards and Expectations," reflecting the rigor of the programs of coursework we expect of students. Indicators of the nature of the coursework taken by, or presented to, students are discussed here.)

What the Commission could not report concerning content:

° The nature of the courses taken by students in high school.*

° The content of the courses taken: for example, what students study in "General Science" or "World History" in high school, or in English in the fifth grade.

° Whether the set of courses typically taken by students in high school has changed over time, beyond shifts among tracks or programs.

° How the substance of the courses offered to, and taken by, students in high school, or the substance of subject matter taught in elementary school, has changed over time.

° Whether the courses taken by students in high school in this country differ from the courses taken by high school students in other countries.

° Whether, and how, the substance of the courses typically offered and taken by students in high school, or the substance of the subject matter taught in elementary school, differs among industrialized countries.

*The Commission was able to report on students' course-taking patterns only because it requested and supported a one-time survey of the transcripts of high school graduates. The information was not then readily available among data-reporting activities, and still is not.

° How the content of courses taken by students in high school, or of subject matter taught in elementary school, corresponds to what the public and its educational leaders feel the schools should teach.

° Whether the material in widely-used textbooks is up to date.

3. Standards and Expectations--The requirements and values communicated to students at points in their school careers.

What the Commission reported concerning standards and expectations:

° That, during a period of time when the amount of homework assigned to students was declining, grades rose and achievement fell. (Risk, pages 19-20)

° That students in other countries were required to take three times as many advanced mathematics and science courses as students in the U.S. (Risk, page 20)

° That states required too few courses in the academic basics of mathematics, science and computer technology, social studies, English, and foreign languages. (Risk, page 20)

° That statewide testing programs aimed almost universally for "minimal" competencies, minimums which had become the "maximum" expectations that were communicated to students. (Risk, page 20)

° That many public colleges have changed their admission policies to accept any high school graduate in their state, serving notice that the nature of a student's coursework or his or her grade point average in high school make no difference in determining whether he or she attends college. (The Commission noted that a trend in this direction also had taken place among more selective colleges and universities.) (Risk, pages 20-21)

° And that the textbooks and other instructional materials used in school demand too little of students, having been written down to lower reading levels, showing less and less of the influence of experienced teachers and scholars, and presenting students with academic material that would not be likely to challenge many of them. (Risk, page 21)

What the Commission could not report concerning standards and expectations:

° Whether the courses required by states for graduation from high school have changed over time, and, if so, how.

° Whether local course requirements for high school students differ from state requirements, and, if so, what they are and how they differ.

° Whether local requirements are changing over time, and, if so, how.

° The rigor of the school work that is actually required of students through assignments, homework, and course tests and quizzes, beyond the inferences that can be made from textbooks and achievement tests.

° Whether and how the academic demands of school work have changed over time, and how the work done by students in this country compares with the work required of students in other countries.

° Whether, in general, the content of textbooks has become less demanding, academically, over time, or whether the books have just become easier to read.

° Whether state and local testing programs are becoming more or less demanding, over time.

° What standards or expectations grades or teacher testing in subject matter communicate to students, and how these teacher standards or expectations compare with local or state achievement testing and minimal competency testing.

° How the standards represented by grades and teacher testing in this country compare to grading and subject matter testing of teachers in other countries.

° Whether grading has become "inflated" over time--that is, whether teachers are giving higher grades for comparable work, compared with grades given in the past.

° Whether there has been a trend up or down over time in the use of tests or other standards to determine if a student is promoted from grade to grade or level to level in school.

° Whether the school systems of other countries use tests and other yardsticks more than we do to determine progress through the school system.

° Whether parents expect more or less from their children in school now than they used to expect and communicate.

4. Teaching--the quality of teaching as a practice and as a profession.

What the Commission reported concerning the quality of teaching...

...as a practice:

° That the aptitude test scores of students going into teaching are too low. (Risk, page 22)

° That too little of the teacher preparation program, especially for the preparation of elementary school teachers, consists of courses in educational methods, and too little in the subjects to be taught. (Risk, page 22)

...as a profession:

° That teachers are paid too little and have too little responsibility for important professional decisions, such as the selection of the textbooks they use. (Risk, pages 22-23)

° That there are critical shortages of teachers in certain subjects (mathematics, science, and foreign languages) and specialties (education of the gifted and talented, of language minority students, and of the disadvantaged). (Risk, page 23)

° And that shortages of teachers in mathematics, science, and English are resulting in a large proportion of new teachers hired to teach in these areas who are not trained or certified to teach the subjects. (Risk, page 23)

What the Commission could not report concerning the quality of teaching...

...as a practice:

° The capability of our teachers, directly measured, in the professional practice of planning and conducting lessons.

° The pedagogical skill, generally, of our teachers, compared with the teachers of the past, or with the classroom skill of teachers in other countries.

° The quality of teachers' knowledge of the subject matter they teach, measured against notions of what they should know, compared with teachers in the past, or compared with teachers in other countries.

° The ability of our teachers to teach academic subjects to students who vary in background, capability, and interest or motivation; whether our teachers are improving in this ability over time; and how our teachers compare in this regard with teachers trained in other countries.

° The relationship between alternative approaches to teacher preparation and the relative proficiency of teachers in the classroom.

° The prevalence or status of different approaches to teacher preparation that seem to be either successful or unsuccessful.

° The ability of teachers to handle classroom discipline problems; how this ability has been changing over time; and how our teachers compare in this regard with teachers in other countries.

° The nature and success of efforts by school systems and states to improve the proficiency of teachers through staff development or inservice training.

What the Commission could not report concerning the quality of teaching...

...as a profession:

° The range in average teacher salaries among states, school districts, and professional specializations.

° How the salaries of U.S. teachers compare with those of teachers in other countries, in terms of relative buying power, and whether the buying power of teachers is going up or down in different countries.

° Early indicators of the long-range supply of teachers, such as the career intentions of students graduating from high school.

° Reasons cited by high school seniors or college students for not going into teaching (ie, low salaries, the poor prestige of the profession, perceptions of teachers having little professional autonomy, poor working conditions, etc.).

° The relative importance of various incentives in making teaching more attractive to those in the profession, such as higher salaries, greater possibility for career growth, more professional autonomy, better working conditions and support.

° The status of various professional incentives for teachers, both in this country over time and in other countries.

° Systematic tracking of the demand for, and supply of, teachers broken down into various professional specialties, and reported for states or regions of the country.

° Trends over time in the standards applied by states to certify new teachers and to maintain the certificates of veteran teachers.

° The nature of the standards applied by local school districts in recruiting and retaining teachers, including the use of different approaches for evaluating teacher performance.

° How the public perceives the status of teaching as a profession, and how this has changed over time.

° Perceptions of the status of teaching as a profession in this country, compared to its prestige in countries with different histories, cultural values, and organizational structures for education.

5. Leadership and Support--Efforts by the public, policy-makers, and parents to support and provide direction to the schools.

(The Commission on Excellence did not report findings having to do with the support and leadership provided to the schools, but the Commission did make recommendations in this area, implying the need for the following indicators, which do not seem to be available, now:)

° Regular reports of the fiscal effort put forth by different

countries to support their schools, in terms of school expenditures as a proportion of GNP.

° Evidence of the range and level of specific efforts to support schools at the state and local levels, such as levels of expenditure, number or proportion of bond issues passed, or changes in state appropriations for education.

° The range in tax burden for education among states and local school districts.

° The relative cost of meeting different educational demands, such as education of disadvantaged, handicapped, or gifted and talented students.

° Geographical differences in the costs of education, such as the costs among regions of the country or different costs for schooling in sparsely-populated areas, cities, and other types of community.

° The relationships between cost factors and educational outputs.

° The involvement of parents and the local community in making decisions about school programs, or in contributing to these programs.

° The nature and level of efforts by parents to monitor and encourage the progress of their children in school.

° The nature and number of cooperative programs beween business and the schools.

° The perceptions of policy-makers and leaders at the national, state, and local levels about the quality of the schools and what the strengths and weaknesses of the schools may be.

° The nature of school improvement efforts being launched at the national, state, and local levels, and trends in these efforts over time.

OUTPUTS

What the Commission reported concerning student achievement (Risk, pages 8-9):

° That there had been general patterns of decline in scores on standardized achievement tests administered nationwide.

° That scores had declined in general on the Scholastic Aptitude Tests.

° That scores had declined on the College Board achievement tests in subjects such as physics and English.

° That achievement in science had declined steadily on the National

Assessment of Educational Progress from 1969 to 1977.

° That there were specific problems of poor (and declining) performance in the "higher order" aspects of reading, writing, and mathematics on the National Assessment.

° That U.S. students fared poorly in international comparison of achievement.

° That the number and proportion of students scoring 650 or higher on the SAT's had dropped.

° That most gifted students appear to be achieving at a level below their tested aptitude.

° That scores on the Graduate Record Examination had declined.

° Results of one-time surveys of functional illiteracy which indicated that about 23 million adults were functionally illiterate, that about 13% of school-aged youth were functionally illiterate, and that over 40% of minority youth were functionally illiterate.

The Commission also recognized (Risk, page 11) that the average person in the U.S. today is provided more schooling (if not better schooling) than the average person received a generation ago. This point is based on steady increases in the proportions of people completing high school, attending college, or completing college over the past 80-100 years.

What the Commission could not report concerning student achievement:

° The number or proportion of students nationwide who seem to know concepts and principles that would be recognized as basic to the academic subjects taught at different levels in school. For example, how many students understand and can apply the experimental method in science, know the central theme of Moby Dick, or can apply tenets of the Bill of Rights to contemporary situations?

° The achievement of today's students in the U.S. compared with contemporary students in other countries, as opposed to comparisons made 10-15 years ago.

° The ability of students in the U.S. to solve complex problems in the different academic subjects by finding and interpreting the appropriate information, reasoning analytically, and expressing their conclusions effectively.

° Trends over time on a comprehensive index of our educational productivity that would be more meaningful than SAT scores; for example, Wurtz and I (Wurtz and Selden, 1985) have suggested an annual "national educational index" based on the product of two numbers: the proportion of a common core of academic content objectives that students seem to have learned each year, and the percentage of students who have complete certain levels of schooling, such as hi

school, that year. (Such an index could, and should, also be adjusted for costs and educational effort factors over time and among school systems.)

° Trends over time in basic measures of educational achievement, such as functional illiteracy.

° The range in average student achievement among significant political units, such as states or a sample of local school districts.

° Trends in achievement over time in states or in local school districts facing different challenges and situations.

(Since the Commission did not consider many individual indicators of student participation and retention in school, and since these are areas where existing data are relatively extensive and useful, I will not devote space to consider what indicators of participation may not be available.)

Why We Do not Know Some of the Things We Need to Know About Our Schools

Given this preliminary, crudely-organized list of some of the indicators I believe the Commission could have used, but that I do not believe were available to it, let me conclude by considering why these indicators may not be available, so we can at least point toward developing them in the future.

First, let me explain the tests that I did and did not apply to this list. I have tried to list only indicators that are relatively significant: that is, they involve variables and analyses that would be particularly useful to educational decision-makers and policy-makers. Second, I have relied on my knowledge of the data on the educational system that are and are not available on a regular basis. I have not been able to conduct exhaustive searches to verify my understanding in every case. In some cases (not many, I hope), I may not be informed well enough; in other cases we may agree that related data are available, but I will believe that they are not fine-grained enough, or regular, enough to be useful.

INPUTS

Time. The status of indicators concerning the amount of time scheduled and allocated to schooling reveal a problem that will recur frequently in this discussion. The length of the school year, the length of the school day, and the structure of the school day are set by states, more or less officially depending on the state. Local school districts and individual schools, public and private, may meet, fail to meet, or exceed these standards, so that local practice may vary substantially. Only a census of the states and a regular survey of local districts would reveal norms and the degree of variability around the norm for these dimensions, and each brings with it effort in terms of data collection and reporting.

Indicators involving how time is used in school introduce the

second problem endemic to indicators. Even though we know that how teachers use scheduled time is important, measuring this variable validly and monitoring it over time or among school systems present serious technical challenges, and would probably be costly. Similarly, measuring and tracking how well students are taught to use their own time to enhance learning would be difficult and costly.

Content. The problem here seems to be the level of detail of the information we collect. We are just beginning to monitor the courses that are required by states and local school districts for graduation from high school. While these efforts have been one-shot projects conducted to monitor recent reform initiatives, they could be made regular quite easily. The bigger challenge is collecting information on what students study below the level of the course: what is typically presented to students in each subject at each level of school, and how much does this content vary among schools around the country? This would require surveys of state and local curriculum objectives, content analyses of widely-used textbooks, and surveys of teachers to describe what other content and activities they present to their students.

Standards and Expectations. Needed here are surveys of state, local, and classroom practices in setting, communicating, and enforcing academic standards for students. We know how many states have minimal competency testing programs, and we recently learned what subjects they cover, at what levels they are administered, and how they are used, in most states. We also know, from occasional surveys, how much homework students are assigned. We do not know what standards states and local school districts apply to promote students from level to level. We do not know what criteria teachers apply in assigning grades and how they might be changing over time. We do not know how teachers use classroom tests of subject matter. We do not know enough about what parents expect of their children in school, or how well these expectations are communicated to students. In order to obtain this information, we would need new or expanded surveys of accreditation bodies, local school administrators, teachers, parents, and students.

Teaching. Indicators of the quality of teaching as a practice suffer one, central shortcoming: they are all indirect. We infer the competence or professional skill of teachers from aptitude test scores, college grades, courses studied, paper-and-pencil qualifying examinations, and compliance with certification standards, but not from direct measures of the ability of teachers to teach students. To measure teaching skill directly, we would need an informed definition of the qualities and behaviors that go into good teaching, and then we would need to operationalize this definition (or multiple definitions) with procedures for observing teachers. With definitions and operating procedures (which some states and many local school districts are developing in order to evaluate teachers) a national, or international, sample of teachers could be observed periodically to provide longitudinal and comparative data on the overall pedagogical ability of teachers. With these techniques, we could also refine the observational methods to measure special abilities of teachers--the ability to teach students with particular characteristics with which we are concerned, or to do other, specific aspects of the job of teaching.

Indicators on teaching as a profession will probably fill in quickly. There is a great demand for information on what state and local school systems are doing to enhance incentives and working conditions for teachers, covering salaries, pay-for-performance provisions, career ladders, professional evaluation systems, and steps to reduce non-professional duties and stress. The challenges for indicators in this area seem to be arriving at standard definitions of concepts such as salaries, benefits, and professional incentives, and then setting up routine programs and procedures for collecting and reporting this information on states and local school districts.

Leadership and Support. The Commission's analysis, and the school improvement efforts that came with the reform movement of which the Commission was a part, included many recommendations for local school leaders and administrators to enhance the involvement and support of parents, citizens, businesses and others in the schools. To track these efforts and at least their perceived effectiveness, surveys would be needed of school administrators, school board members, business leaders, and others to determine the extent and nature of efforts they have made to develop community support and to exercise new levels of leadership for the schools.

OUTPUTS (Achievement)

Currently-available achievement indicators are lacking in their level of detail. The National Assessment of Educational Progress has made a major contribution in providing us with periodic, national data at three age levels on student achievement in each of the basic academic subjects. What we need beyond this is to break down achievement data into greater detail. We need to monitor the specific portions of the core, academic subject matter we are concerned with in the schools that students know and do not know. NAEP is being augmented to assess the status of this kind of specific, subject-matter knowledge in the areas of literature and American history. Collecting this level of information across subjects on a regular basis would permit more effective fine-tuning of educational programs at the state, local, and classroom levels, allowing us to attend to those parts of the academic program that students do not seem to be learning. We cannot do this with the level of detail offered by NAEP's current design. We also need more detailed sampling and reporting, so that outcomes on the Assessment can be reported by state and by meaningful types of local school district. Finally, we need to collect information on educational programs or efforts that are associated with student achievement, in order to begin to understand what educational efforts or approaches seem to provide the best results; NAEP has begun to collect this kind of information on the schools it samples, and this effort should be refined and developed.

International indicators of achievement suffer mainly from infrequency. The IEA studies are on a 10- to 15-year cycle, meaning that sometimes the most recent available comparative data are very old. Five years would seem to be a reasonable time period for this cycle, to ensure that comparsions are not erroneously extrapolated from situations that no longer exist. Along with a shorter cycle,

IEA-type studies should be made more routine. Under the present arrangements for conducting the IEA, we cannot count on the studies being repeated in the future; each cycle is conducted through private organizations in an ad hoc way. The program should be institutionalized so that participation in the studies and support for them can be relied-upon.

Summary

I have attempted to do three things in this paper. The first was to establish a structure by which one could talk about educational indicators--both those that we already know about and those that we may need, but do not have available to us, now. The second was to describe some of the indicators that at least one group, the National Commission on Excellence in Education, was unable to analyze because they did not, and still do not, seem to be available. The third was to speculate briefly on what would be involved in developing at least some of the important indicators that we are missing.

This paper should really be used a pilot-test for a process that should be done more thoroughly and systematically, but it does reveal both that there are important kinds of information about education that we lack, and that we can identify and address these gaps. Venturing forward into these undeveloped areas will take time, effort, and money, but few tasks offer as great a potential to give us useful tools for improving education. Information is power, and better information about education would give us tremendous leverage in managing and improving it.

Notes

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