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ABSTRACT

Instructional Accomplishment Information (IAI) Systems data bases provide the opportunity for new and powerful studies relevant to educational policy issues at a local and/or national level. This report discusses the methodology for "schooling policy studies." The procedures are illustrated using a yet-to-be-completed analysis of the Los Angeles Unified School District's policy for Racially Isolated Minority Schools (RIMS). The method has three steps: (1) establishing a RIMS-specific District level data base containing data on achievement, student demographics, school demographics, and classroom practices for implementing instructional programs in RIM schools; (2) developing an analysis design for RIMS-specific data which identifies skills students do have (rather than "missing" skills) and has significant implications for adjusting RIMS schooling practices; and (3) using analyses which identify successful instructional practices to implement a two- to three-year instructional plan for moving achievement along in RIM schools. This methodology provides an affirmative complement to traditional measurement and evaluation methodology used to analyze conventional achievement test data. (BS)

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METHODOLOGY FOR ANALYSIS OF IAI DISTRICT LEVEL DATA BASES

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ABSTRACT

Data bases yielded by Instructional Accomplishment Information Systems provide the opportunity for new and powerful studies relevant to policy issues of concern in education at a local and/or national level. The methodology for such studies is discussed. Procedures are depicted using Racially Isolated Minority Schools in Large Urban Districts as an illustration.

METHODOLOGY FOR ANALYSIS OF IAI DISTRICT LEVEL DATA BASES

Patricia Milazzo, Aaron Buchanan, Richard Schutz

Instructional Accomplishment Information (IAI) Systems represent a new approach to instructional program measurement and evaluation. On superficial inspection, IAI instrumentation[1] can look much like counterparts associated with achievement testing, but there are fundamental differences in IAI systems and conventional achievement testing systems in how the instrumentation is derived and how the results are used.[2] Just as IAI student and teacher materials can look like routine tests, an IAI data base at the district level can look like routine compilations of "test" scores. Conventional measurement and evaluation methodology can, of course, be applied to any IAI data base, but this practice loses the prime value of the data. Extracting the unique information residing in an IAI district level data base requires appropriate methodology. This methodological aspect of IAI is the subject of the present paper.

Like other aspects of IAI systems, the methodology for analyzing IAI data bases is simple compared to the complicated statistical and inferential apparatus that is currently associated with the analysis and interpretation of achievement test results. At the district level of aggregation an IAI data base has rich potential for analyses that can illuminate and guide school improvement initiatives in the district and at the same time yield better general understanding of schooling and its accomplishments.

A district level IAI data base is suited ideally for two general categories of analysis: schooling subject studies and schooling policy studies. Schooling subject studies query the data base from the orientation of a given academic subject (e.g., reading, mathematics, composition, science, etc.). Currently, the methodology for such studies is most conveniently depicted by reference to summary reports of several studies that have been conducted in specific academic

subject areas. For example, see Buchanan and Milazzo, 1978a and 1978b; Fiege-Kollmann, 1978 and 1980; Buchanan and Perkins, 1980; Cronnell and Humes, 1980; Lawlor et al., 1981. For this reason, this paper will not deal further with the description of the methodology for schooling subject studies.

Schooling policy studies query the data base from the orientation of a given administrative policy. Administrative policies can take several forms. Currently the "hot" policies in schooling relate to the intersect of professional and demographic characteristics that are legislatively or judicially mandated (e.g., educationally disadvantaged, handicapped, and bilingual). The two general categories of subject studies and policy studies, then, could also be distinguished fundamentally as dealing with matters of quality and equality in education.

Schooling policy studies involving IAI data bases first became feasible with the 1980-81 data base for the Los Angeles School District's Grade-by-Grade Advancement Program. Some sense of the methodology can be gained by reading the one analysis that has been completed (Milazzo, 1981). However, the methodology is more conveniently depicted by sketching the method for an analysis yet to be completed. The policy at issue in the illustration pertains to a matter of local and national concern: racially isolated minority schools. It should be evident through the example that the methodology is readily pertinent to other matters of current policy concern in education.

Illustration of Schooling Policy Study Method

The administrative policy relevant to the study is the LAUSD policy for Racially Isolated Minority Schools (RIMS). The policy is important to Los Angeles Unified School District because RIMS is a key element in the District's program of school excellence. Information regarding instructional accomplishments in RIM schools is particularly

timely now, given the predictably critical "evaluations" the District will receive from several outside agencies relative to their integration program. If these evaluations progress the way integration evaluations almost always progress, we will read still another spate of comparison data showing us that there is a "significant relationship between ethnicity and performance scores; that the majority of students who demonstrate serious achievement deficiencies are in RIM schools; that the majority of RIMS students have not mastered basic skills, given a pre-established standard of acceptable performance (certainly more than 60% of RIMS students at grades 4-6 will be identified as 'failing' if overall achievement levels of 70% and 80% are used as the standard); that many Hispanic children and just about all black children in the District are in RIM schools," and so on.

None of the findings generated by the conventional evaluation studies on instruction is news; the well-known situation is simply restated in each new study. But the publicity that surrounds these findings is news, and its consequences can only be detrimental. That is, the typical evaluation of instruction in RIM schools is grounded in the tacit assumption that learning is an "all or nothing" event, and the inevitable follow-up to this kind of evaluation is yet another program of RIMS remedial instruction concentrated almost exclusively on a collage of "missing" skills where instruction has already failed. The net effect is to truncate both instruction and achievement for minority students. Alternative analyses, however, are possible, grounded in the assumption that important learning from past instruction can always be demonstrated and that new instruction can be developed around new priorities for expanding proficiencies that students already have. The study sketched below gives alternative data analyses and implications for instructional planning.

The analysis is also pertinent to a better understanding of schooling practices and effects generally. If nothing else has been learned from studies over the past two decades of the contemporary

American social system and of public schools as part of that social system, it is that the elementary grades are the last good chance most children in RIMS environments typically have. Students who leave the elementary grades without expanding a specific, identifiable set of skills (which most RIMS students can demonstrate) seldom make it in high school, or later in conventional life. Many of these children drop out of high school, and still others who do graduate have not expanded even the most rudimentary skills ostensibly learned in school. It is difficult to see how the situation can do anything but get more urgent. What is needed is information to justify specific operational efforts to dramatically affect schooling and learning in these schools.

The method can be described in three steps:

- The first is to establish a RIMS-specific data base at the District level containing data on achievement, student demographics, school demographics, and classroom practices for implementing instructional programs in RIM schools.

- The second activity provides a design for analyzing the RIMS-specific data and lodging implications for adjustments in RIMS schooling practices.

- The third set of activities lets us use these analyses to implement a two-to-three year instructional plan for moving achievement along in RIM schools. Here we operationalize strategy for building on skills that RIMS students do have in place and for expanding the range of those skills, instead of looking for skills that are "missing" and then somehow trying to fill the gaps.

These steps are elaborated in the description that follows.[3]

Step 1: Establishment of a District Level RIMS-Specific Data Base

The key component of this data base is the instructional accomplishment information derived from the Survey of Essential Skills (SES) used in LAUSD. To generate this component, the 5% random sample that is already a part of the SES operating system can readily be used by simply duplicating the RIMS data in another file. The 5% sample is a representative District sample and hence a representative RIMS sample

(about 50% of the 5% sample, or some 4500 RIMS students). A sample this size provides all the power and efficiency that is needed. Moreover, it provides a quick, inexpensive way for getting longitudinal data because there are already random samples for 1979 and 1980, and another sample for 1981 will become available this Spring.

This will generate two major elements of the District level data base: 1) grade-by-grade achievement scores for RIMS students on the SES and 2) grade-by-grade student demographics for RIMS. Analyses can go a long way with just those data. But three more elements are needed for comprehensive analyses:

- One, a file of school level demographic data on each RIM school is needed. The records should be left open-ended, because no doubt other variables will be added as time goes on. It is evident now that there is pertinence in data on variables such as:

  - neighborhood/socio-economic status data
  - student body size/classroom size
  - categorical classifications
  - release rate (frequency for early dismissal during the school day for teacher conferences, special meetings, special events, etc.)
  - percent of days dedicated to formal, school-level assessment
  - rate of teacher absenteeism
  - physical characteristics of school facility
  - discipline indicators (e.g., referral rates)

  Most of this information, and a lot more, is already a part of District record. The major concern is to be careful to keep this file manageable and meaningful, and to avoid including data on variables just because they can be collected.

- Two, a summary of school achievement scores is needed, for every grade and for every SES skills category and every item. These data are already available on school summary

tapes compiled annually to generate individual school reports for the SES September reporting period. Data from RIM schools can be sorted into a separate file. Since the summary school data bases contain aggregated school data, this procedure will provide aggregated scores for all RIMS students, grade-by-grade, on the individual SES items and on clusters of items as well.

- The last element of the data base has to do with classroom practices data. These data will provide the most edifying analyses, and probably the most significant insight into the adjustments that are needed in RIMS instruction. Just the minimal amount of exploration done to date with the help of the LAUSD Research and Evaluation division has revealed several classroom practices like the following ones that were different in suburban schools where SES scores were higher than RIMS; in fact, they were different for the few RIM schools where SES scores were higher than other RIM schools:

  - start-up date for teaching each subject
  - ending date for completing instruction on each subject
  - number of days each week that instruction is provided in a specific subject area
  - textbook program used in a specific subject area
  - average length of a classroom lesson in a specific subject area
  - percentage of textbook lessons completed in a school year
  - percent of class time dedicated to testing
  - length of use of a particular textbook series in a specific subject area
  - length of use of a particular teaching strategy for a specific subject area
  - percentage of substitute teacher days
  - percentage of classroom time controlled by specialists in each subject area
  - percentage of school day spent disciplining students

- percentage of school day spent directing aides
- percentage of aide-directed classroom lessons

Step 2: Design for Analyzing RIMS-Specific Data and Their Implications for Instruction

In setting out to look at RIMS accomplishments, a variety of standard data tables can be routinely generated. For example, computer processing can readily provide grade-by-grade achievement scores broken out by language and ethnicity, by the various categorical classifications, by teacher absenteeism rates, by the several typical school socio-economic status categories, by textbook programs, number of days of instruction each week in a subject area, amount of lessons completed during the school year--all of the variables identified in the earlier listings.

Computer analysis can also interrelate key elements from each type of data base: school demographics, student achievement and demographics, and classroom practices. This type of activity is more difficult to accomplish than the previous one. But these data analyses will be the key to a RIMS improvement plan. What this type of data analysis will not do is interrelate every variable to every other variable in every likely extrapolation, and generate a mound of output. It is unnecessary to engage in that sort of exploratory data analysis, because the keys to the kingdom are already in hand in the form of achievement scores. The first and cardinal rule in querying RIMS data bases is to look at the aggregate of RIMS students who have accomplishment scores that are at or above the district average; or, even better, at or above the average for non-RIMS students. The commitment is to isolating RIMS accomplishments, and not just because it is beneficial to point to them--although that would be a refreshing change for RIMS. The intention is to isolate RIMS accomplishments so that they can be traced back to practices that schools have some control over. This type of analysis looks at schooling practices relative to RIMS students who demonstrate accomplishments, because the search is for what works

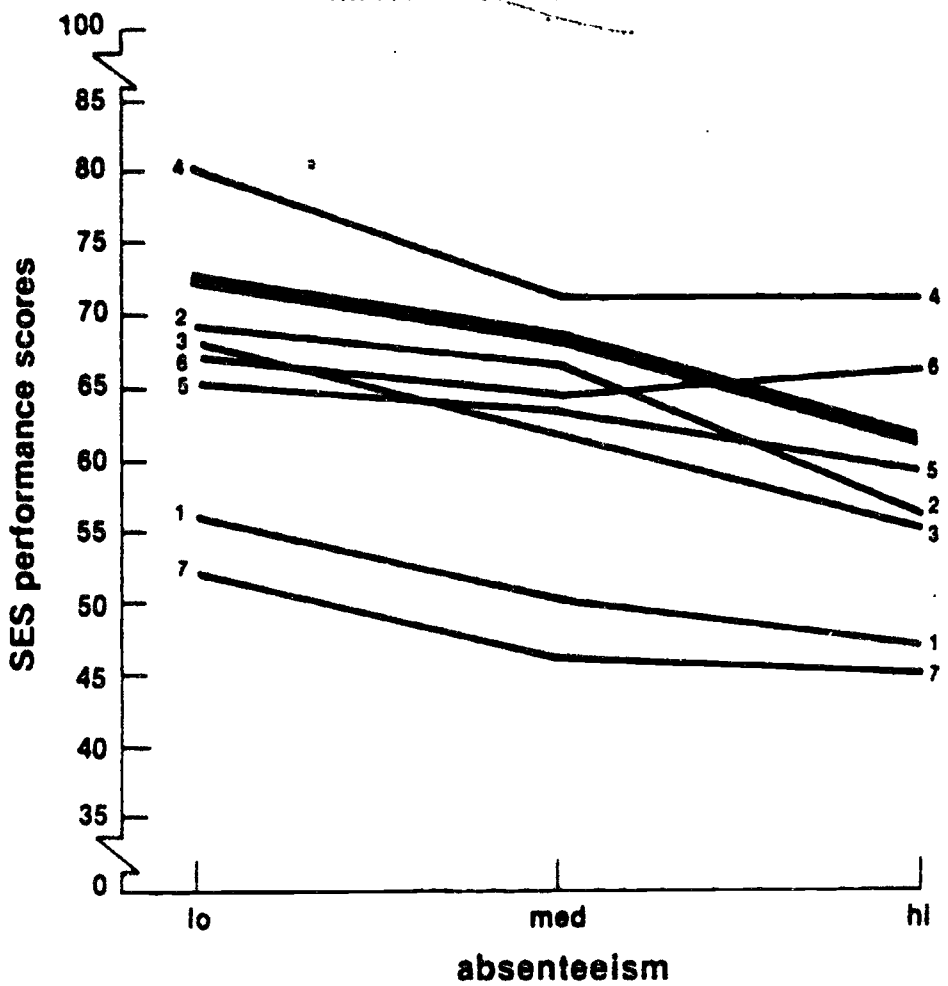
in RIMS, to find it and hang on to it, and to generalize it to other RIMS. What is finally sought is an annual profile of successful schooling practices in RIMS. Of course, the analysis will look annually at overall RIMS accomplishment data, and that is discussed below. But every time one leads with such summaries, the first question faced is "But how do RIMS compare with white, suburban schools?" This level of gross comparison shows only that the scores for the overall group of white students is higher than for the overall group of black students. But that is when people quit listening, thinking they know the rest of the story without hearing it--nothing has been accomplished.

An example of the method is useful here. In 1980, the average mathematics score for low absentee grade 6 white students was 73%. The average mathematics score for a similar group of black students was 60%. This 60% score is seriously depressed by the fact that many of the lowest scores in the District are in black RIMS. However, some black RIMS students are pulling the RIMS average up. We queried the 5% sample data base and found that about 20% of the RIMS group was at or above the 73% level. Such data can be obtained easily from the 5% sample. We can then relate this group of high-accomplishments RIMS students to their schools and teachers, because each student record in the 5% sample is led by unique school identification and teacher name. When a classroom practices file is completed, it will be possible to accumulate a profile of practices that typically associate with high-achievement RIMS. In addition, a few teachers can be further consulted via a one page sheet of information which can be keyed into a computer file. The data collection would probably involve just a few teachers and could be completed in a week or two. By leading this way, attention moves away from ethnicity (where it doesn't belong) to instruction and practices (where it does belong). Moreover, the information can effectively respond to individuals and interest groups who want to contend that any kind of exploratory data analysis is intended only to explain away the "fact" that RIMS don't teach their students anything.

This approach will provide a major source of descriptive information for the District's prospective planning for RIMS instruction. However, it is important to also recognize that the District will want to make presentations to the Board and the public about the general state of affairs within the RIMS on at least an annual basis. For this purpose it is reasonable to illuminate <u>patterns</u> of accomplishments on the various skills categories at each grade level. For example, the two graphs on the next page show mathematics performance for RIMS students at grade 3 (graph A) and at grade 6 (graph B). In each grade, the graphs show a break out of RIMS averages on all of the major skill categories which were assessed (the numbered curves), and by high, medium, or low absenteeism. These several skill area averages are displayed around the overall District average for the grade level (the heavier line which is unnumbered). This District average is for all students who took the SES. On inspecting Graphs A and B, it can readily be seen that RIMS demonstrate instructional strengths at each grade level. At grade 3, most of the seven broad skill areas which were assessed hover around the overall District average, and it is two skill areas which seriously depress the average for black students at grade 3. Already, the instructional problem is showing some signs of being controllable. What's more, it is clear that students who have low absenteeism rates are really quite close to the District average, except on the two skill areas, numeration and problem solving. There are a few pieces of information that don't show on this chart, but they help our understanding. First, numeration and problem solving were difficult for <u>all</u> students. Of the seven skill categories in grade 3, problem solving had the lowest score and numeration had the next lowest score--for everybody. Second, when we look at the specific skill descriptors for numeration and problem solving, we see some explanation for low scores. Problem solving, for example, includes three items on selecting a number sentence to describe a real life problem, or vice versa, and those items account for the lowest scores--for everybody. When one looks to find this skill reflected in lessons in the textbooks or other instructional materials that are in wide use in the District,

BREAKDOWN OF SKILLS CATEGORIES SCORES FOR BLACK STUDENTS

MATHEMATICS: GRADE 3



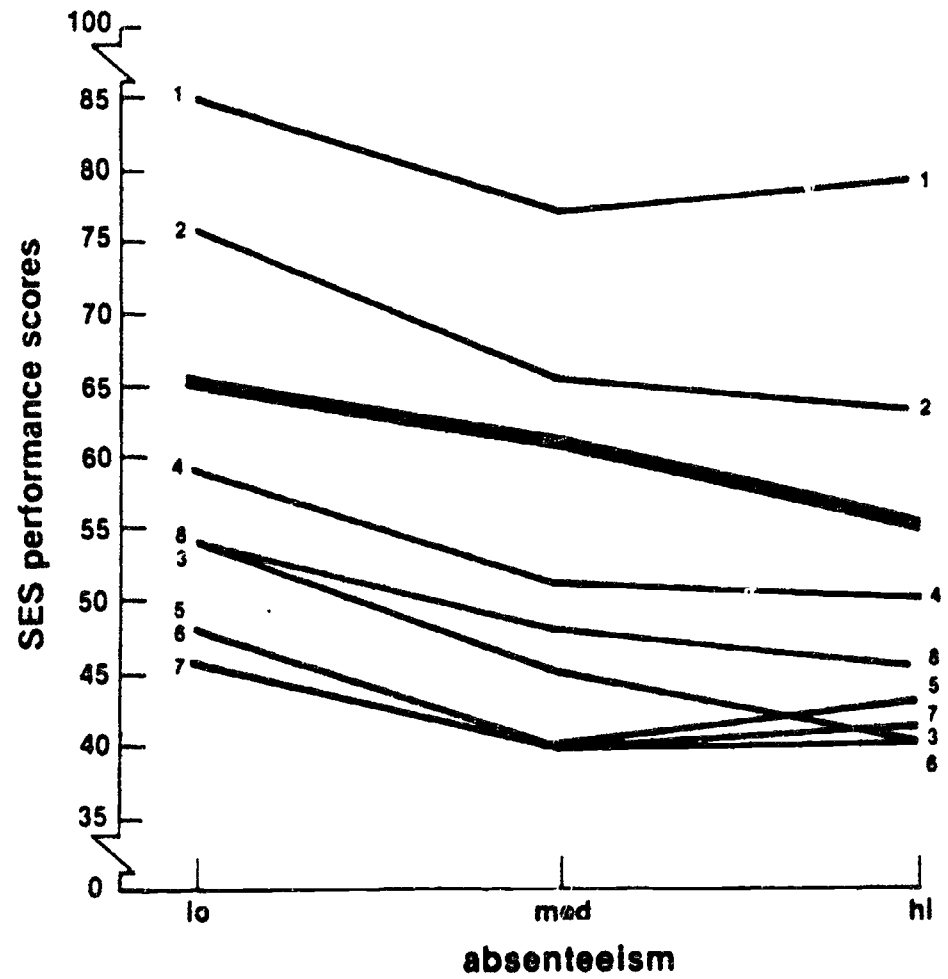
Graph A

Skills categorie Index:

1) numeration
2) +/−
3) ×/÷
4) fractions
5) measurement
6) relations/functions
7) problem solving

UNNUMBERED: district average for all 34,789 students who took the grade 3 SES (all ethnic groups)

MATHEMATICS: GRADE 6



Graph B

Skills categories index:

1) +/−
2) ×/÷
3) fractional numbers
4) decimals
5) geometry
6) measurement
7) relations/functions/statistics
8) problem solving

UNNUMBERED: district average for all 37,653 students who took the grade 6 SES (all ethnic groups)

it can hardly be found. This means that as things stand, teachers may have to locate or develop many of their own lessons in order to teach this type of problem solving, an unlikely event in most classrooms and highly unlikely in RIMS classrooms where teachers' time is seen to be at a premium even more than for most schools. Again, when viewed through this sort of clearly focused lens, the achievement picture for third grade black students in LAUSD is very encouraging.

Now look at the grade 6 graph (graph B). Two of the skill areas assessed in grade 6 (+ and -; x and ÷), are well above the District average. When we look at the specific skill descriptors for the content of these skill categories, we see skills that are reflected in several lessons within grade levels, and are strengthened over two or three grade levels. On the other hand, when we look at the skills represented in geometry, measurement, and relations/functions/ statistics, we have a harder time finding the skills reflected in discrete lessons in instructional materials. There is usually something taught, but the opportunity to teach and learn is seriously restricted. Again, this situation has serious implications for instruction in general; but the implications are much more serious for RIMS, where teachers' time is in very short supply.

One last point, before we go on. Look at fractions in the grade 3 chart and then in the grade 6 chart. At grade 3, black children do considerably better on fractions than the District's overall mathematics score, but at grade 6 they do a lot worse. That has nothing to do with "being black" or with "declining" growth in ability to do fractions. The pattern is typical for all of the District's ethnic groups, and the explanation seems to reside in instruction. Fractions in grade 6 are nothing like fractions in grade 3. The matter is not one of declining achievement, it is an instructional matter that reflects two different situations with a single label. In fact, about the only skill categories that maintain their rank across grade levels are the computation skills, which are high, and problem solving, measurement,

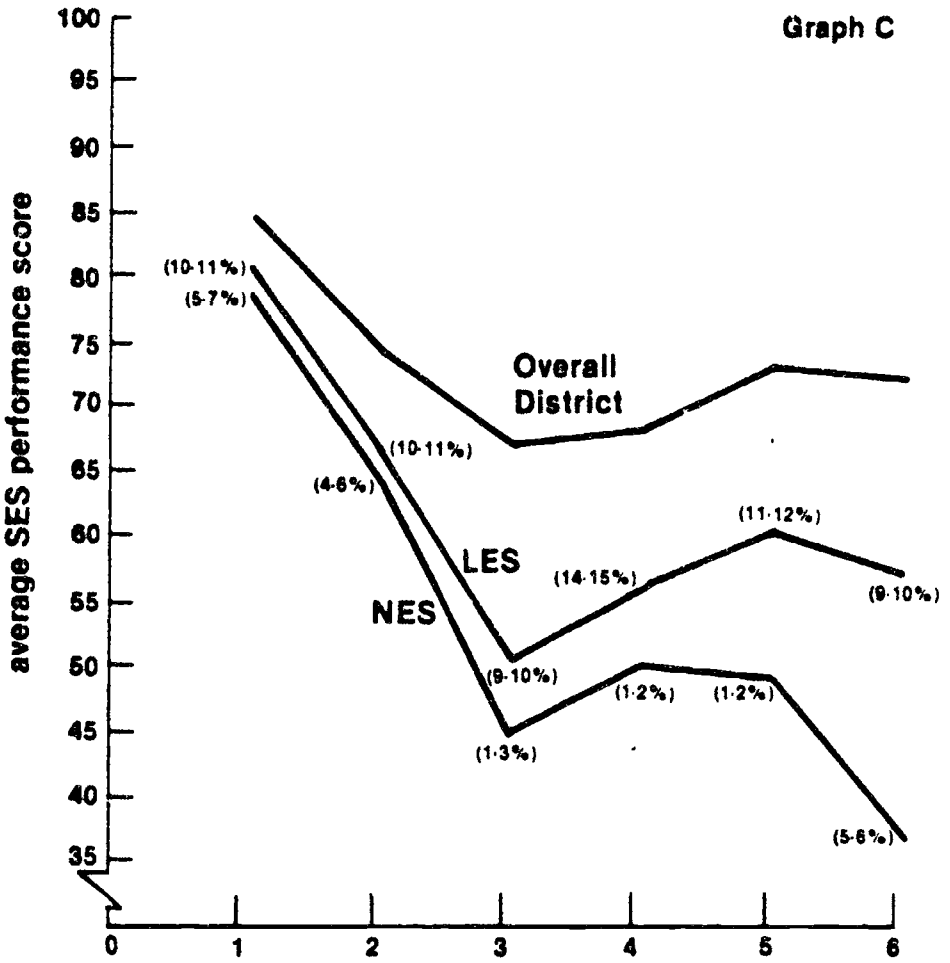
and relations/functions/statistics, which are low. Given the previous discussion, one could have predicted that ranking order. The reading story and composition story conclude the same way.

For the large part, all of the demographic examples get this same kind of discussion, so that the implications for instruction are common, regardless of the demographic features that are looked at. On the other hand, the implications for RIMS, when one looks at effective classroom practices and the general strain on teacher time, are nicely specific, and these can be outlined in Step 3.

There is one demographic factor that appears to be dramatically different; language--especially for students who are identified as NES at the beginning of the school year, but even for LES students. However, the language factor, which looks critical for the reading subject area (not surprisingly), really is not a serious problem for mathematics. Look at graphs C and D on page 13. They are admittedly full, but they tell the story. Graph C shows the average SES scores at each grade level for NES (bottom curve), LES (middle curve), and for the District overall (top curve). The percentages on the LES and NES curves are a bit confusing without further explanation. Look at the grade 1 points for NES and LES. Five to 7 percent of all students who took the grade 1 survey were NES; 10 to 11% of all students who took the grade 1 survey were LES. Since the District demographics showed approximately 7% NES and 11% LES overall, we can assume that most of the NES/LES students took the grade 1 reading survey. That is notable because the NES teachers had a choice, except in grade 6, where every student in the District regardless of language fluency took the SES. Across all the grades, pretty much all the LES students took the SES surveys. However, in grades 3, 4, and 5, NES teachers tended to exercise their option to not assess their students. Only 1 or 2% of the students at these grade levels were opted into the surveys. That is notable, too, because we are probably looking at the "best" NES students in grades 3, 4, and 5; so the reading averages at those grade

GRADE-BY-GRADE PERFORMANCE: DISTRICT OVERALL, NES, LES
READING
(% = percentage of total District population at grade)

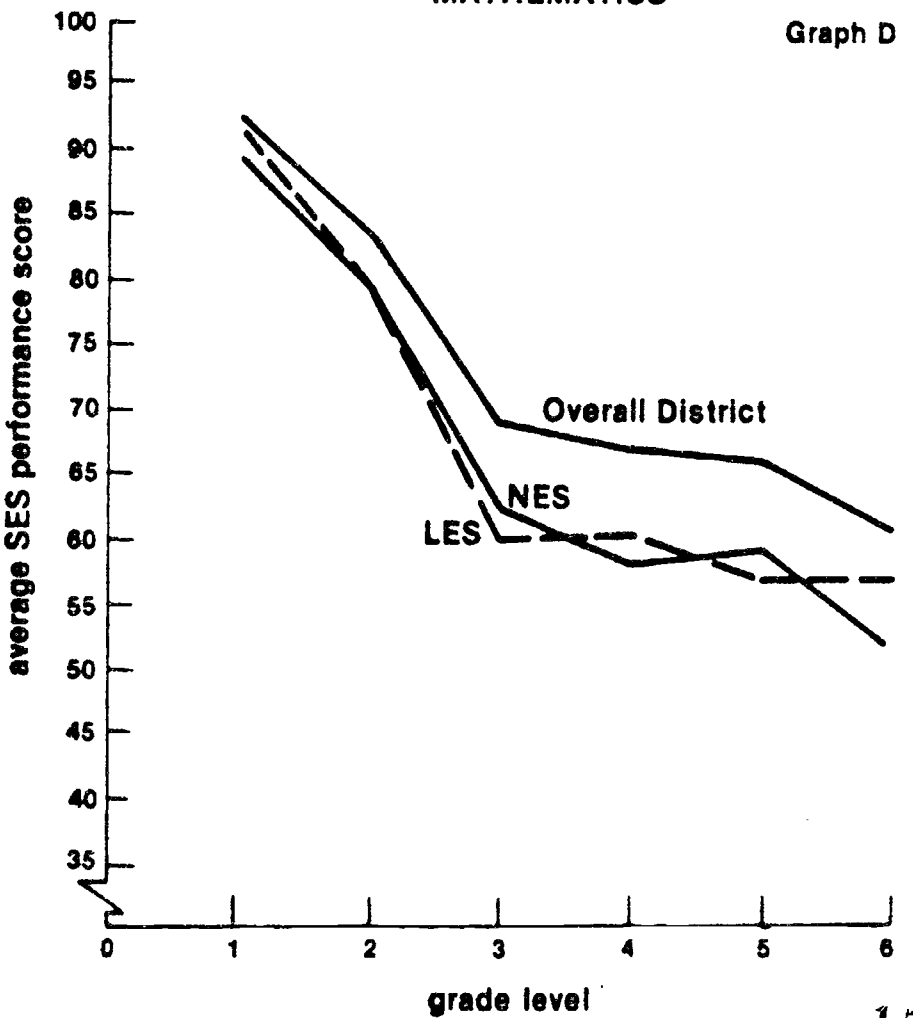
Graph C



grade level

MATHEMATICS

Graph D



levels are probably higher than they would be if we had all of the NES students,taking the SES. In fact, they would probably look like the grade 6 average, which is almost guess level. What all of this information means, bluntly, is that English language reading proficiency for NES students at grades 3-6 is not being attained. In part, this is predetermined by the designation NES. Graph D, however, indicates that the determinants lie in pedagogy rather than elsewhere; mathematics instruction doesn't suffer too much from lack of English language fluency.

Absenteeism was generally an important consideration, no matter what the demographic characteristics. Students who were absent more than 20 days tended to have averages that were approximately 10% lower than averages for students who were absent less than 10 days. "10%" is an important number because it turns up so much. "10%" is also about the difference in proficiency between one year and the next on skills that are taught and retaught. About 10% of the students are picked up on skills which are retaught a second year, so we are likely looking at a grade-by-grade effect.

At grades 3-6, where there were the greatest differences between ethnic groups in proficiency patterns, there were little or no differences between ethnic groups in terms of absenteeism patterns. Hispanic children were absent more than other ethnic groups, but not much. The greatest differences in attendance patterns between ethnic groups came in grades 1 and 2 where black children and Hispanic children tended to be absent considerably more than other ethnic groups. Even though grades 1 and 2 are where we see the least differences between ethnic groups in terms of proficiency patterns, this decreased attendance by black children and Hispanic children at grades 1 and 2 may certainly have a cumulative effect on achievement in grades 3-6. Because proficiency at grades 1 and 2 is generally high, any effects of higher absenteeism probably would not show until later grades anyway.

These examples give an image of the story on the demographic analysis. Our exploration always leads to powerful and plausible explanations in terms of the expectations in the LAUSD skills continuum, their congruence or incongruence with actual lessons in instructional materials, and the availability of teacher time to produce lessons where they don't exist.

Step 3: Initiatives for Instructional Improvement

The initiatives for improvement of instruction build directly on the analytical capability for identifying successes in RIM schools wherever they occur and for tying these successes as much as possible to antecedents over which the school is likely to be able to exert some control. Many of these controllable antecedents to instruction have already been alluded to. Other, obvious ones involve the use of instructional time and space, characteristics of teaching staff, school attendance, amount of support from parents, special physical or emotional/behavioral problems, and so on. The strategy is to locate successful practices and to build upon them, and it requires two distinct kinds of initiatives:

- Pre-instruction initiatives. These initiatives involve antecedents to success that are beyond the direct scope of instruction but are nevertheless ones over which a school may be able to exert some control. If students are absent or late upwards of ten or more days during the year, then ostensibly the school can mount some initiative to improve attendance, or, in case of illness, to send special assignments home. Where the level of parent involvement with student work in school is low, initiatives can be undertaken to provide parents with better information about student needs and accomplishments including samples of the kinds of performances that students can and cannot manage. In the long run, obtaining parent support directly in identifying and building on student accomplishments may well be more productive than informing them about general problems with attitude, study habits, and classroom behavior.

- Instructional initiatives. The most important aspect of initiatives for direct improvement of instruction is specific staff development. For RIM schools, it has to be assumed that

the materials used now are about as good as the current state of the art in textbooks. Anyhow, the way teachers use materials (or make them work) is probably most important. There is one exception. Skills that are expected to be delivered in schools must have strong representation in either print materials or in detailed guides for teachers to use in creating their own activities. Especially in RIM schools, teachers can't be expected to deal with large numbers of students for whom success is likely to be marginal at best and still be able to develop instructional resources on the fly. The rule of thumb that should operate in these schools is that places where a reasonable amount of materials don't exist, say at least four or five integrated lessons, district expectations in reading, mathematics, and language arts don't apply.

The most important element of actual instruction is to build on successes that individual students already have. The assertion may seem obvious, but it's a fairly wide departure from prevailing approaches in the U.S. to elementary schooling instruction, especially in schools where students are typically quite far behind the pace for regular grade-by-grade skill development. The dominant model is for remediation. Teachers have a pre-established network of skills that students are supposed to have and proceed with individual students to fill in missing pieces. Ideally, in the remedial model, instruction is heavily individualized with many different students working on quite different skills. Building on successes or accomplishments is not the same. Here teachers look for medium to high scores rather than low ones and go to work there. In this case, students learn to apply skills before they begin to develop new ones. The process is more like construction than remediation, since it implies that the most immediate goal is to increase and improve range of operation or application or, more specifically, conditions under which performance can be expected to be successful. Two assumptions are involved. First, students who are one to two years behind the pace of regular grade-by-grade expectations cannot be expected to catch up "naturally" or by routine remediation. Second, there are indeed children who may not progress instructionally despite the schools' best effort. Often they are students who are not in school and not likely to come. This does not include students who are in school but are simply hard to teach. The idea is to reduce the set of students that cannot be reached as much as possible and to take responsibility and direct resources where schooling has some chance of having an impact.

The implications for staff development are far reaching. First of all, teachers need help in getting past guilt for those expectations that cannot possibly be met, at least not directly or within a short range of time. They need help in beginning to identify potential for immediate growth in students. They

need help in reorganizing skill development so that success can be built in early and often, and sets of activities built to closure in no more than five to ten lessons.

Second, RIM schools need assistance in plans for dealing in simple, realistic ways with students who are clearly behind the pace of regular instruction and to be able to show how instructional initiatives have been implemented in two ways. They need to be able to obtain regular and explainable information on student completion of work. The purpose is to provide administrators in RIM schools with better data on how instruction is being delivered, not as a device to make teachers more accountable, but to give credit for teaching effort in cases where a great deal of progress still may not have been made. Using the same technology, they also need to identify student success on a regular and explainable basis and to get this information into a more accessible form for personnel who are responsible for research and analysis. Both kinds of data collection can, if desired, be integrated nicely with end-of-year data obtained from administration of SES.

Final Note

The methodology depicted in the previous pages provides an affirmative complement to traditional measurement and evaluation methodology which has been used to analyze conventional achievement test data. This methodology is consistent with a new awareness in the field (Cronbach and Associates, 1980) that instructional program evaluation and school improvement can all too easily get side-tracked by the asceptic compulsiveness which often characterizes "analysis of variance" and "true experiment." The methodology sketched here appears a useful mechanicsm for accomplishing the technical and professional intentions of the "new view" of program evaluation.

NOTES

1. Examples include the Los Angeles Unified School District's Survey of Essential Skills, 1979-1982 editions; Sacramento City Grade 5 Proficiency Survey; SWRL Proficiency Verification Systems Inventories; the planned Washington DC Assessments, 1982 edition.

2. Definitive descriptions can be found in: Designing an Instruction-Referenced System for Large-Scale Evaluation of School Achievement, Aaron D. Buchanan and Patricia A. Milazzo, presented at the Third Annual Conference of the California Society of Educational Program Auditors and Evaluators, Los Angeles, May 12-13, 1977; and PVS Coordinators Manual, SWRL Educational Research and Development, 1978. Concise descriptions of the differences between the various achievement instrumentation are found in: What Makes Achievement Tests Tick: Investigation of Alternative Instrumentation for Effective Program Evaluation, Ralph Hanson, Richard Schutz, and Jerry Bailey, a SWRL document, 1980; and Equating Instructional Accomplishment Inventories and Standardized Achievement Tests, Patricia Milazzo and Aaron D. Buchanan, a SWRL document, 1980. Other more recent descriptions, intended largely for the lay public include: Scope of Work for Meeting Competency Requirements of School Districts Grade-by-Grade Assessment and Advancement: Design, Development, and Verification of Implementation Resources and Procedures, a SWRL working paper, 1980; Proficiency Verification Systems, 1981 Brief, a SWRL document, 1981; Design Parameters for Development of an Information System from a Skills Framework, Aaron Buchanan and Patricia Milazzo, a SWRL document, 1980.

3. The description is for purposes of exposition only. In this sense it is strictly hypothetical. There is no commitment, express or implied, of any agency, institution, organization, or individual to the description.

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