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ABSTRACT

This paper addresses issues related to the possible inclusion of items in the Schools and Staffing Survey (SASS) to measure instructional practices and teaching effectiveness. The SASS is a national survey of schools and teachers conducted by the National Center for Education Statistics. This report explores the purposes that can be served by measuring instructional practices on a national scale, and then examines how teaching effectiveness is conceptualized. Another section describes some strengths and limitations of observational studies of classroom instruction and makes a similar assessment of survey studies. Some attention is given to curricular reforms and how their impact might be assessed. The last sections of the paper suggest specific ways in which instructional practices and curricular content might be measured through the SASS, including the selection of specific school subjects and grade levels for attention. A number of large survey studies have already provided valuable information about curriculum and instruction in U.S. classrooms, and the SASS could join them. There does not appear to be any federal program in which instructional practices and opportunities to learn will be monitored in the future and the SASS, with its large sample of teachers, seems to be an excellent vehicle for the measurement of both curriculum and instructional practices. The SASS also seems ideally suited to monitor the classroom consequences of reforms such as curriculum standards. (Contains 50 references.) (SLD)

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Should SASS Measure Instructional Processes and Teacher Effectiveness?

Working Paper No. 96-07

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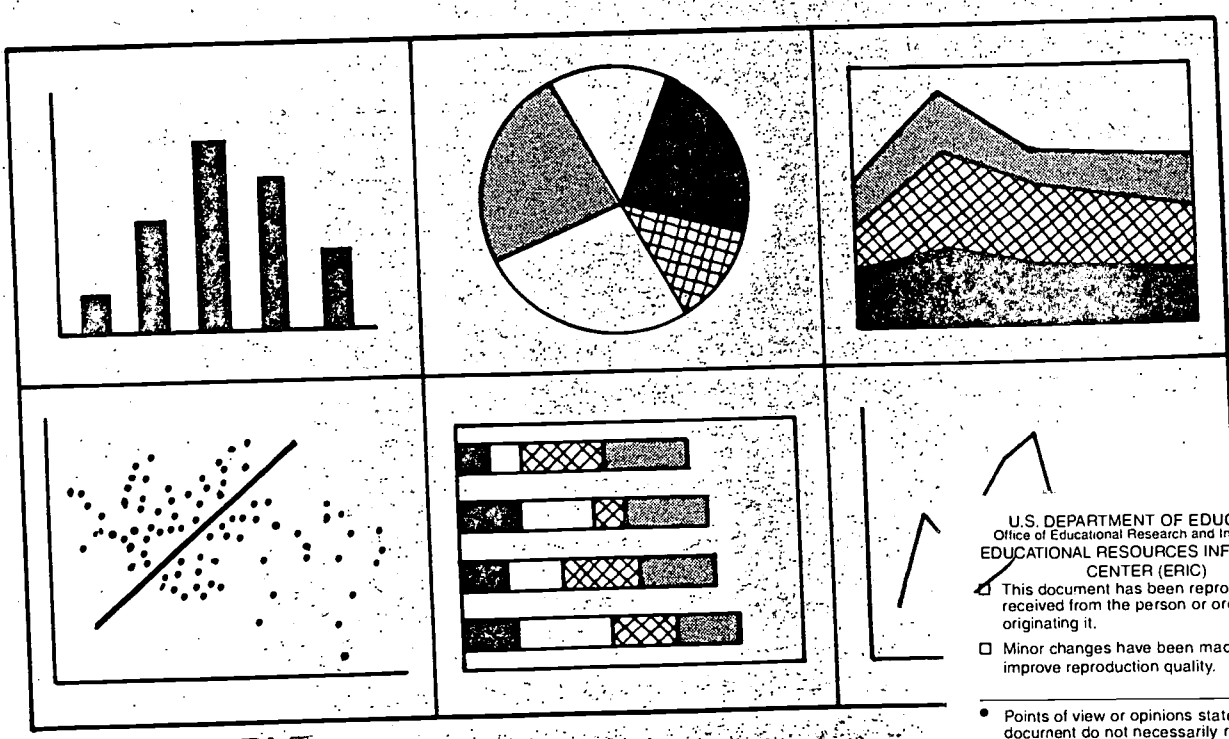

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Should SASS Measure Instructional Processes and Teacher Effectiveness?

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March 1996

Foreword

Each year a large number of written documents are generated by NCES staff and individuals commissioned by NCES which provide preliminary analyses of survey results and address technical, methodological, and evaluation issues. Even though they are not formally published, these documents reflect a tremendous amount of unique expertise, knowledge, and experience.

The ***Working Paper Series*** was created in order to preserve the information contained in these documents and to promote the sharing of valuable work experience and knowledge. However, these documents were prepared under different formats and did not undergo vigorous NCES publication review and editing prior to their inclusion in the series. Consequently, we encourage users of the series to consult the individual authors for citations.

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Should SASS Measure Instructional Processes and Teacher Effectiveness?

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March 1996

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Should SASS Measure Instructional Processes and Teacher Effectiveness?[1]

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December, 1995 Draft

This paper addresses issues related to the possible inclusion of items in SASS to measure instructional practices and teaching effectiveness. In order to answer the question posed, the paper explores what purposes can be served by measuring instructional practices on a national scale. It then examines how teaching effectiveness is conceptualized. Turning next to substantive and methodological concerns, a section describes some strengths and limitations of observational studies of classroom instruction and makes a similar assessment of survey studies. Some attention is then given to curricular reforms and how their impact might be assessed. The last sections of the paper suggest specific ways in which instructional practices and curricular content might be measured through SASS, including the selection of specific school subjects and grade levels for attention.

Why collect national data on instruction?

We begin by briefly examining some of the main reasons to collect information about instructional practices/processes on a national scale. If we are to understand, monitor, and improve our nation's schools, accurate and timely empirical, descriptive data about how schools work must be available. The activities that

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[1]This paper was written at the request of Policy Study Associates for use by NCES. The author is solely responsible for the ideas presented.

I would like to acknowledge the generous assistance of John Mullens at PSA in providing numerous documents and surveys. Andrew Porter and Fred Newmann, both at the University of Wisconsin, Madison, Leland Cogan of the TIMSS at Michigan State University, Joan Talbert at CRC at Stanford University, and Valerie Lee at University of Michigan, also made surveys or papers available.

I have tried to cite sources as appropriate throughout the paper. However, the surveys and papers that form the core used in preparing this paper are much like an extended family. Surveys have uncharted historical connections to one another, with items borrowed and adapted freely. Many commonalities in thinking appear in papers on the topic. I apologize in advance for any omissions in citations or for mistakenly citing a source that is not the definitive one.

take place in classrooms to engender student learning and development are the heart of any school's educational efforts. It is in the transactions between and among teachers, students, materials and tasks that deliberate efforts to educate occur.

Descriptive information about how teaching and learning occur in classrooms and about what is taught provides the basis for monitoring the status of instruction in a large number of settings. Such information might provide periodic assessments of stability and change in instruction, particularly as changes relate to deliberate efforts to reform or alter curriculum and instruction. Similarly, if collected along with knowledge of particular policy initiatives, curriculum standards, or changes in teacher preparation or staff development, information describing classroom instruction might help track the impact of various policies on what transpires in classrooms.

Descriptive information about classroom processes also can contribute to the deliberations of teachers, teacher educators, subject matter and other educational associations, and policy makers at local, state, and national levels. Basic researchers also benefit from information about what actually goes on in classrooms.

Many argue that classroom process information is most valuable when connected to student achievement and attainment data. Data from NELS have been analyzed recently by Kupermintz, Ennis, Hamilton, Talbert and Snow (1995) and Lee & Smith (1995). Both research groups found significant relationships between certain measures of instructional practices (e.g. emphasis on higher order thinking), teacher attitudes (e.g. willingness to alter instructional practices if students are not learning) and student performance on both math knowledge (lower mental process) and math reasoning (higher mental process) items. A similar analysis of teachers' responses to the CLAS survey by Wiley & Koon (1995) also demonstrates the potential for connections between instructional items and student attainment. These studies support the importance of monitoring instructional practices in the nation.

SASS as currently structured is not linked to student data on achievement or other outcomes and a considerable redesign and change in sampling strategy would be required to do so. However, links to achievement can be **direct** and **empirical** as when teachers and their students are studied, or links can be **putative** and **conceptual** based on known or assumed connections between practices and achievement. Existing research and theory can be used to formulate the presumptive connections and might also inform the design of empirical studies.

How is teaching effectiveness conceptualized?

The charge for this paper includes a consideration of whether measures of instructional practices and teaching effectiveness should be included in future SASS instruments. It must be noted here that a broad consensus on a definition of effective or good teaching does not exist. Empirical evidence, theory and values along with specified criteria for effectiveness all enter into a conception of effective teaching. In addition, considerable evidence that instructional practices need to be tailored to subject matter, developmental levels of students, and other factors is now available, suggesting that effectiveness comes in a number of varieties.

Although not all teachers and policy makers endorse one view of effective teaching in a given time period, visions of effective teaching change over time. For instance, during the late 1970's and 1980's, the process-product research program (Brophy & Good, 1986) assumed there were generic characteristics of good teaching (i. e. they apply to all school subjects and grade levels considered). By focusing primarily on features of teacher-centered instruction, this influential, empirical research program identified a number of teacher behaviors (direct instruction model) that correlated with student gains on standardized achievement tests in reading and math, primarily in elementary schools.

Critiques of the process-product view point out that the correlational method embodied the existential fallacy (Stodolsky, 1988). That is, only currently used practices could enter the model of effective teaching. The use of data on individual teacher behaviors decontextualized instruction and made it difficult to know how to put the instructional program into operation as a combination of student and teacher behaviors (an intact lesson structure). The model excluded behaviors that might be subject- or grade-level specific. The model did not examine student behaviors. The model adopted a transmission view of teaching. Effectiveness was operationalized by achievement tests that almost exclusively contained lower-mental process skill items.

Now, as evident in many standards and reform documents, a constructivist point of view of learning and teaching is holding sway. This view directs attention to students' active role in the learning process. Classroom arrangements such as group work, debate and discussion are believed integral to effective instruction. In addition, teaching and learning are assumed to be different from one school subject (or even topic) to another. No fully general model of effective teaching and learning is expected. Last, different student criteria are employed to judge effectiveness. More emphasis is placed on reasoning, problem

solving, creative production and long-term products. Methods of student assessment beyond standardized achievement tests are endorsed.

The transmission and constructivist views of teaching both may have a proper place in the analysis of teaching effectiveness. Flexibility in instructional strategies may be a hallmark of effective teaching. Different instructional practices may be desirable depending on instructional goals and lesson formats. Instruments to assess effective practices must contain an appropriate range of items to tap lesson structures, content, instructional strategies and teacher and student activities. There is a danger in only assessing popular visions of effective teaching which may not be widely implemented or universally appropriate at any given time.

Some Features of Classroom Activity and Teacher Behavior: Observational Studies

Observations of instructional activity are often thought to be the most valid method of data collection. While observational studies are generally beyond the scope of proposed SASS activities because they are very expensive, direct observation can often be used in early stages of instrument development to provide relevant categories and items for surveys and other measurement approaches. Observations also have a place in validity studies.

Observational studies provide accumulated knowledge from which to formulate productive questions. Useful reviews of research on curriculum and teaching are provided by Shulman (1986) and Darling-Hammond & Snyder (1992). Here we take a selective look at past observational research on teacher behavior and classroom activity.

Observational studies (e.g. Good and Brophy, 1986; Goodlad, 1984) have documented a robust picture of teacher-centered instruction primarily oriented toward lower-level cognitive goals. Recitations, variants on lecture, and seatwork are the primary instructional formats used in most classrooms. However, systematic variation occurs when subject matter is examined. Similarity of instructional practices across teachers may be greater in subjects such as mathematics, than in subjects such as social studies or English (Stodolsky, 1988). Variation is also tied to teachers' conceptions of subject matter and goals (Grossman & Stodolsky, 1994, 1995; Shulman, 1987).

A variety of contextual and situational factors produce variation in teaching and consequently limit the stability and generalizability that can be expected in studies of teacher behavior, especially at the level of the individual teacher. As noted elsewhere (Stodolsky, 1990) subject matter, grade level,

lesson type, and lesson goal account for variation in teaching behaviors and instructional arrangements. In addition, the type of students and track level of courses (Oakes, 1985) along with district policies, type of school, and other institutional factors may all influence a teacher's choice of curricular content and instructional methods.

Limitations of data from observational studies

Perhaps one of the most important limitations of available observational studies, a feature shared with survey studies, is that the contexts studied are limited. The preponderance of large-scale studies have been conducted with elementary school teachers of reading and math. A few have focused on social studies instruction at the elementary and high school levels (Stodolsky, 1988; Newmann, 1992; Newmann & Wehlage, 1995). While there are a variety of small-scale observational studies, including studies of classroom discourse, our knowledge is not deep with respect to the state of classroom curriculum and instruction in fields such as science, social studies, English, foreign language or the arts. We also have surprisingly few observations of what actually takes place in high school classrooms.

Another limitation of available observational research is that it has focused primarily on teacher behaviors. A more ecological approach to classroom settings, such as employed by Doyle (1983), Gump (1982) and Stodolsky (1988), examines classroom activities, and incorporates knowledge of what both students and teachers do during instruction, along with knowledge of materials and tasks. However, studies of classroom ecology have been relatively rare. In most observational studies, when students are observed it is to assess their on-task behavior or involvement.

Nevertheless, observations can provide evidence of real instructional experiences unrivaled by other methods. Particularly if one wants to understand the qualities of transactions that occur in classrooms and their intellectual and social features, observations can play a possibly unique role. Observations, done properly, can reveal the connections between what is taught and how it is taught--observations can preserve classroom events as they occur together. The issue for NCES or others striving for a national picture of curriculum and instruction is under what circumstances, if any, direct observation should be used as a data gathering approach. Similarly, it is important to determine how useful information obtained with other methods such as surveys or teacher logs can be for the same purpose.

Studies of Curriculum and Instructional Processes: Survey Research

A number of large survey studies, often funded by NCES, NSF, and OERI, have provided valuable information about curriculum and instruction in our nation's classrooms. The main contributors to our knowledge about curriculum and instruction on a national scale are NELS:88, NAEP, Reform Up Close (RUC) and SIMS. Weiss (1993) provides some useful information on instructional practices among math and science teachers. The validity of using surveys as a measurement tool in the area of curriculum and instruction has also been examined (Burstein et al,1995; Porter, 1995; TIMSS) and survey development is ongoing (Porter, 1995).

Useful reviews and analysis of many of these survey projects can be found in NCES working papers (Leighton,1994a,b; Leighton & Mullens, 1994; Mullens et al, 1994, 1995), a report by Porter (1995) and the work of Schmidt & McKnight (1995). A catalogue of instruments measuring the enacted curriculum in math and science at the middle and high school levels is now available (Porter & Smithson, 1995). A list of sources for major surveys can be found in Appendix 1.

The surveys distinguish between plans (intended curriculum or objectives) and actions (enacted or implemented curriculum). Most of these surveys emphasize curriculum and instruction in action, although goals for instruction may also be measured. To varying degrees, these surveys seek to measure **plans** (instructional goals), to document **what** is taught (content/topics and intellectual processes, time allocations, emphases); **how** instruction is organized (pedagogy, teacher and student activity, homework and tests); and **resource use** (e.g. technology, textbooks). The surveys are often described as measures of students' opportunity to learn (OTL), a term borrowed from the IEA studies. McDonnell (1995) provides a useful discussion of the OTL construct.

The uneven coverage of contexts found in observational studies is also characteristic of the survey research. In an interesting juxtaposition, however, most of the surveys deal with high school or 8th grade instruction while the observation studies are mainly at the elementary level. In fact, with the exception of NAEP 4th grade surveys, Weiss (1994), the Consortium on Chicago School Reform (1994) which borrows from NELS and RUC, and the CRC (1994) survey of elementary math teachers in California, it was difficult to locate surveys of the enacted curriculum given on a large scale at the elementary level. High school coverage is also somewhat uneven. NAEP targets 12th grade and therefore obtains information primarily about advanced courses. There is reason to believe that the practices used in more advanced courses may differ to some extent from those in the

earlier years of high school. Burstein et al (1995) document that teachers of more advanced courses are more accurate in reporting topic/content coverage and emphases.

The surveys are also uneven with respect to subject matter coverage. Largely due to the efforts of NSF, major survey development has occurred in math and considerable attention has also been paid to science instruction. Applebee (1981; 1992) conducted national surveys on the teaching of writing and literature at the high school level which provide modest amounts of information about instructional practices; the Applebee work might be a starting point for further survey development in English along with available NELS items on English. According to Andy Porter, the CPRE School-Based Management Survey (SBM) also contains items dealing with instruction in language arts and social studies at the elementary and high school levels. The items follow the four-part scheme developed by Porter and others to assess teachers' objectives, content covered, modes of instruction and cognitive processes. The content items in the CPRE surveys are rather general and might provide only a starting point for item development in English and social studies. With the exceptions mentioned plus NAEP items and some history items in NELS, significant recent efforts to develop surveys of enacted curriculum and instructional practices have not been undertaken at a level of effort similar to that in math and science in the fields of English, social sciences, foreign language, and other subjects including the arts. In order to obtain information about instructional practices in a range of subjects and grade levels, considerable new survey development is required.

It seems more than financial support has led to so much attention to curriculum and instruction measures in math. Mathematics lends itself to a systematic analysis of its content, topics, and operations because it is the best defined and probably least contentious of all school subjects. Compared to other subjects, there is considerable agreement among math teachers and teacher educators about best practice.

Mapping science curriculum topics may pose a greater challenge than mapping topics in math. Our own work (Stodolsky and Grossman, 1995) on five academic subjects and an analysis of English by Grossman (1993) and Elbow (1990), suggest that there is less agreement about content and teaching methods in subjects such as English and social studies. Many versions of these subjects exist and teachers of English and social studies expect considerable autonomy in the selection of course content, especially because they are not constrained by a perceived content sequence. (Science teachers also report freedom in choice of topics to teach, but share a commitment to the scientific method.) The difficulties confronted in developing social studies and language arts curriculum standards, confirm the lack of

consensus in these fields. The development of surveys with detailed topical analyses for English and social studies, such as those available in math and science, presents a challenge in curricular analysis and instrument development not yet addressed.

Curricular Reforms

Before moving on to specific suggestions regarding future directions for SASS, the issue of curricular reforms needs some discussion. Studies of teachers in settings in which reforms are underway have found a mixed picture at best. For example, in case studies of mathematics teachers attempting to implement the California Math Frameworks, Cohen and Peterson (1990) found only modest changes from conventional practice, confirming the suggestion by Burstein et al (1995) that new practices are "layered" on to old ones. On the other hand, certain changes in math teaching such as the introduction of calculators seem more widespread (Weiss, 1994).

Research on the Coalition for Essential Schools (Muncey & McQuillan, 1993; Little, 1995) documents great variety in the extent to which teachers adopt Coalition principles. However, many teachers report using process writing approaches such as those advocated by the National Writing Project (Freedman, 1987; NAEP Report Card on Writing).

To help understand the implementation of reforms, a first step might be to learn what teachers actually know about proposed reforms and standards. Adequate teacher knowledge and understanding of reforms is far from guaranteed just because standards are published or new frameworks drawn up. The CRC survey provides excellent examples of items that could be used to assess teacher knowledge of curriculum frameworks. It would also be desirable to obtain knowledge of organizational support and provision of resources for reform in departments and schools. In addition, it is important to determine if teachers are asked to act simultaneously on a number of policy initiatives which may not be consistent with one another.

If one of the purposes in monitoring instruction in the nation is to provide information about the progress of curricular reforms, it must be assured that the item pool used to measure curriculum and instruction is adequately tailored to the reforms advocated in each subject matter studied.

An examination of the standards for curriculum in science (NRC, 1994; Rutherford & Ahlgren, 1990), social studies (NCSS,1995) and mathematics (NCTM, 1989;1991) suggests different degrees of emphasis on changing pedagogy and changing content. The math standards may be most explicit with respect to the vision they embody of pedagogy consistent with the recommended

standards.[2] The use of open-ended and student-generated problems and investigations which take place over a number of days are examples of a constructivist pedagogy endorsed by NCTM. Specific items have been written to address features of pedagogy in the NCTM standards; the CRC survey has some excellent examples. Porter (1995) reports making use of the NCTM standards and NSTA standards in developing opportunity to learn topic items for math and science.

Specialized terminology or language poses a possible problem in instrument development with items geared toward reforms. Burstein et al. (1995) in their validity study of surveys in math found that teachers did not always interpret terms in the same manner (e.g "math modeling" had a number of different meanings to the teachers they studied). A term like "investigations" used in the NCTM and California math frameworks might carry a variety of connotations to respondents. Indeed, the term "reform" itself is not used equivalently by those reporting about it.

Last, in some cases the new standards are predicated on teacher mastery of subject matter and pedagogical content knowledge not currently widely held in the teaching force. The TIMSS survey and the CRC survey for math teachers, include items to reveal teachers' conceptual understanding of mathematical material along with pedagogy. It seems likely that items of this type would predict student attainment, and help us document barriers to implementation of reforms. As such, they seem important to include in any effort to measure curricular reform.

Should SASS include measures of instructional practice?

Except for NAEP, there does not appear to be any federal program in which instructional practices and opportunity to learn will be monitored in future. SASS, with its large sample of teachers, seems an excellent vehicle for the measurement of curriculum and instructional practices. However, the inclusion of a fairly comprehensive set of items on content (e.g. as in TIMSS or the Porter OTL four-dimension scheme) would involve a lot of additional respondent time. Further, to adequately monitor pedagogy and track reforms, additional items would be needed.

Since NAEP is an ongoing program that taps into curriculum and instruction in a number of school subjects (although maybe not very deeply), an optimal plan for SASS would complement and supplement efforts planned under NAEP. Some school subjects and grade levels not regularly covered by NAEP should be included in SASS. At the same time, more targeted efforts to link with NAEP

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[2] Of course the NCTM standards also recommend change in what is taught in math classes.

and/or assist NAEP to enhance its curriculum and instruction measures would be highly desirable. Some links to NAEP would also provide tie-ins to student survey responses about their instructional experiences.

SASS seems ideally suited to monitor the classroom consequences of reforms such as curriculum standards. (It may be asking too much to monitor the myriad of other reforms underway.) A selection of specific school subjects and grade levels seems the best strategy here as well. However, in order to maximize insight into how reforms work, it would be desirable to have more teacher respondents from a given school than has been the case in previous SASS sampling, so that information about the presence of particular reform efforts in the schools could be obtained. Linking with NAEP under selected circumstances would also benefit from more clustering of teachers in schools.

Item selection

Let us begin by examining measures of content taught. As discussed earlier, there is a substantial pool of items to use in measuring the content taught in science and mathematics, especially at the middle school and high school levels. Limited topical analysis is also available in U. S. and world history, although not the broader social studies. English is essentially unmapped as is much of the elementary school curriculum. (Exceptions are the three-dimensional content structure developed by Freeman, Porter and others for fourth-grade mathematics and some items from NAEP dealing with reading and writing instruction). The four-dimension topic items such as developed by Porter (1995) for his recent OTL study for math and science, seem a suitable model for item sets to be used in SASS. The four dimensions include two dimensions of topics and the degree of emphasis each receives, cognitive activities (with time distribution) and the medium (mode) of instruction (with time distribution). For school subjects other than math and science, item development analogous to the Porter model would have to be undertaken.

There are quite a few items and item types dealing with pedagogy or teaching methods that seem applicable to most subjects and grade levels, although a careful analysis would be required to assure that practices found in elementary school classrooms were adequately sampled. The language in which methods are described might also require modification and field testing when applied in contexts other than those surveyed to date. In addition, specialized language from reform documents should be used with caution and fully pilot tested to assure common understandings.

Burstein et al (1995) recommend against the inclusion of items measuring goals, as they did not find a good match with

responses and other data sources such as the goals inferred in tests or teacher assignments. On the other hand, they did find meaningful relationships between endorsement of reform goals and reform practices, but not between endorsement of traditional goals and traditional practices. This issue would seem to require further study before eliminating goal items from national surveys. The data pattern suggests in part that most teachers believe traditional goals are worthwhile, even those who are moving their practice in the direction of reform. This finding seems another example of the tendency of teachers to add on to their practice without giving up old patterns. Thus, some tensions inherent in change may be revealed effectively through analysis of goal items. Although not the highest priority, if respondent time allows, goal items should be retained.

As Leighton (1994a) notes, subject-specific questionnaires have been the rule recently. Many common instructional items reappear in surveys for teachers of different subjects in addition to specific items for each subject. The 1994-95 SASS Follow-up Teacher Questionnaire has a number of sections dealing with teaching methods that are promising and which build on development work from other surveys we have discussed. While a good starting point, a careful review would have to be made for appropriateness to grade levels and school subjects selected for study. Also, there may be some overlap in constructs if four-dimension content items such as those in Porter are also in the survey.

In addition to content/topic items and pedagogy items, new items should be developed that assess teachers' specific knowledge of reforms. The CRC survey provides some good examples of such items for the California Math Frameworks. Teacher's subject matter and pedagogical content knowledge required for implementing reform should also be measured.[3] A particularly promising item format has been used in TIMSS and the CRC survey, among others. The items ask teachers to envision an instructional sequence of lesson parts used to teach a specified topic. For example, the CRC survey asked questions about instruction dealing with fractions in an open-response format. The TIMMS items are more structured (See examples in Appendix 2). These items tap lesson organization, content emphasis, pedagogical content knowledge and subject matter knowledge and may be an effective way to tie together features of instructional processes and content in a manner that approximates what actually happens in classrooms. It seems worth considering if such items could be developed for use in subjects other than math.

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[3] Resource use, especially what textbooks and other materials are used is beyond the scope of this paper. The omission does not reflect a lack of importance.

In creating item sets for a survey, it would be desirable to include measures of teacher efficacy and willingness to adapt instruction as these scales have important predictive power in connection with other instructional items. Professional development activities and participation in subject area and other networks should also be assessed. Such measures would reflect teachers' opportunities to learn about or deepen understanding of new approaches. These scales could be part of a teacher background section of the survey.

To create respondent time for the suggested content/pedagogy and teacher knowledge items, we suggest two strategies. One is to eliminate certain parts of the current SASS survey since items have been administered over many years and may be given to a subsample or less frequently. In particular, items dealing with teacher control over policies such as discipline, hiring of new teachers could be omitted. The list of perceived problems (poverty, tardiness, etc) might also be eliminated or given to a subsample of teachers.

The second strategy takes us into the realm of sampling. It seems that not all items need to be given to all teachers. We will recommend selecting teachers of certain grades and school subjects to respond to the curriculum and instruction survey. Other respondents could be used to answer more general questions from SASS. In addition, even teachers within the recommended grades and subjects could be directed (say, by use of their birthday as a sorting mechanism) to answer only certain parts of the survey.

Who should be surveyed?

As suggested, it may not be appropriate for all SASS teachers to respond to items dealing with curriculum and instructional practices. Targeting teachers of certain subjects and grade levels would seem a good approach. However, the decision regarding what school subjects and grades to select is not an easy one.

Because so much investment has been made in instrument development in math, and because the NCTM standards were in the vanguard, it seems appropriate to use math as one of the target subjects. The scope of surveys about math should be expanded to include math in the upper elementary grades (4-6) along with middle school and high school. If costs permit, science is another well developed area that could be studied in the middle and high school levels. In addition to math, Porter (1991) suggests English as an important understudied area. Leighton (1994a) suggests history as another possibility. At the middle and high school levels, both are plausible options, with history having somewhat of an edge in terms of existing instrumentation. If history was selected as a focal subject, the elementary grades

should again be included. Fifth-grade is typically the year when U. S. history appears in the elementary curriculum. So surveys in grades 4-6 would make sense. However, the elementary social studies curriculum is quite diverse and content items should range well beyond history to articulate with actual practice.

At the elementary level, time allocations to subject differ and this information might form one criteria for school subject selection. We know that reading(language arts), then math are given the most instructional time in the elementary grades, especially at the primary level. In fact, little time may be devoted to science instruction in many elementary schools while modest amounts are allocated to social studies. By the upper elementary grades, social studies may be on a slightly more even footing with language arts and math.

Within social studies, there is contention about the direction the subject should take. Both history and social studies standards (NCHS, 1994; NCSS, 1995) have been formulated and there is considerable tension among adherents to each set of standards. A SASS survey aimed at charting reform in this area, would be challenged to accommodate differing points of view. On the other hand, the English/language arts have the problem that their curriculum standards are not completed. In fact, it appears that work on the English/language arts standards has stopped, at least for the time being. Defining English/Language Arts at the elementary level is also messy. In some cases students will receive instruction primarily geared to developing skills in reading and/or writing; in other instances the instructional program will be more directed toward literature. Based on these factors, the choice of history/social studies might make the most sense.

A cautionary note should be sounded with regard to the subject-specific focus of this discussion. Current instruments and our discussion have assumed that instruction is compartmentalized by subject. Empirical evidence suggests this is still largely true, but a number of curricular reforms call for more subject matter integration and interdisciplinary teaching. It seems important to bear this in mind in reviewing items for inclusion in SASS and in thinking about how to select teachers. One hopes that there are teachers whose instructional programs are strongly integrated for whom answering a more conventional survey could be problematic. Such teachers may be more likely to be found in elementary schools, but high school programs emphasizing subject integration are also being implemented.

Support for some instrument development studies seems in order as an important step to prepare for the next SASS cycle. These studies would be directed at enhancing our capability to measure curriculum and instruction in subjects hitherto understudied--especially elementary social studies, and math, and

history/social studies at the middle and high school level. Work might also begin on mapping the English/language arts curriculum for future studies. The instrument development studies would involve multi-method investigations that could determine the validity of pilot items and other methods. Effective use of teacher logs, collections of teacher assignments, exams and other materials; textbook analyses, and classroom observations might be incorporated in the instrument development process. We agree with Burstein et al (1995) that validation studies should regularly accompany the introduction of new surveys.

Additional small studies conducted through SASS (perhaps in Follow-Up surveys) might delve into topics that might be of interest to the nation from time to time. Illustrative is the section of the SASS 1994-95 Teacher Follow-up Questionnaire which inquires about portfolio assessments. Inquiry into special topics such as this could be a regular part of SASS, with only a fraction of teacher respondents being asked to provide information. In this manner, not all teachers would take exactly the same set of items, but reliable information could still be obtained on a number of interesting issues.

References

Applebee, A. N. 1992. *Literature in American high schools.* Albany, N. Y.: Center for the learning and teaching of literature.

Applebee, A. N. 1981. *Writing in the secondary school: Current practice in English and the content areas.* Research Report No. 21, Urbana,Il: National Council of Teachers of English.

Brophy, J.& Good, T. L. 1986. Teacher behavior and student achievement. In M. C. Wittrock (ed.), *Handbook of research on teaching, 3rd edition.* New York: MacMillan.

Burstein, L., McDonnell, L., Van Winkle, J., Ormseth, T., Mirocha, J., & Guiton, G. 1995. *Validating national curriculum indicators.* Santa Monica, CA: RAND.

Cohen, D. K. & Peterson, P. L. 1990. Special Issue of *Educational evaluation and policy analysis, 12(3)*,233-353.

Darling-Hammond, L. & Snyder, J. 1992. Curriculum studies and the traditions of inquiry: The scientific tradition. In P. W. Jackson (ed.), *Handbook of research on curriculum.* New York: MacMillan.

Doyle, W. 1983. Academic work. *Review of Educational Research, 53,* 159-199.

Elbow, P. 1990. *What is English?* Urbana, Il : National Council of Teachers of English.

Freedman, S.W. 1987. *Response to student writing.* Urbana, Il: National Council of Teachers of English.

Goodlad, J. I. 1984. *A place called school.* New York: McGraw-Hill.

Grossman, P. L. 1993. *English as context: English in context.* Working Paper Series, Center for Research on the Context of Secondary School Teaching (CRC), Stanford University.

Grossman, P. L. & Stodolsky, S. S. 1994. Considerations of content and the circumstances of secondary school teaching. In L. Darling-Hammond (ed.), *Review of Research in Education.* Vol 20, 179-221. Washington, DC: American Educational Research Association.

Grossman, P. L. & Stodolsky, S. S. 1995. Content as context: The role of school subjects in secondary school teaching. *Educational Researcher.* 24(8), 5-11.

Guiton, G. & Oakes, J. 1995. Opportunity to learn and conceptions of educational equality. *Educational Evaluation and Policy Analysis, 17(3)*, 323-336.

Gump, P. V. 1982. School settings and their keeping. In Duke, D. L. (ed), *Helping teachers manage classrooms*. Alexandria, Va.: Association for Supervision and Curriculum Development.

Kupermintz, H., Ennis, M. E., Hamilton, L. S., Talbert, J. E., & Snow, R. E. 1995. Enhancing the validity and usefulness of large-scale educational assessments: I. NELS:88 mathematics achievement. *American Educational Research Journal, 32(3)*, 525-554.

Lee, V. E.& Smith, J. B. 1995. Effects of high school restructuring and size on gains in achievement and engagement for early secondary school students. *Sociology of Education, Summer.*

Leighton, M. S. 1994a. *Measuring opportunity to learn: Advancing the state of the art* (Working Paper for The National Center for Education Statistics and MPR Associates, Inc.). Washington, DC: Policy Studies Associates.

Leighton, M. S. 1994b. *Measuring instruction: The status of recent work* (Working Paper for The National Center for Education Statistics and MPR Associates, Inc.). Washington, DC: Policy Studies Associates.

Leighton, M. S. & Mullens, J. E. 1994. *Measuring curriculum content: The status of recent work* (Working Paper for The National Center for Education Statistics and MPR Associates, Inc.). Washington, DC: Policy Studies Associates.

Little, J. W. 1995. Subject affiliation in high schools that restructure. In L.S. Siskin & J. W. Little (eds.) *The subject in question: Departmental organization and the high school*. New York: Teachers College Press.

McDonnell, L. M. 1995. Opportunity to learn as a research concept and a policy instrument. *Educational Evaluation and Policy Analysis, 17(3)*, 305-322.

Mullens, J. E. 1995. *Classroom instructional practices: A review of existing measurement approaches and their applicability for the teacher followup survey* (Working Paper Series No. 95-15). Washington, DC: National Center for Education Statistics.

Mullens, J. E., Weiner, L. K., Williams, A. S., & Leighton, M. S. 1994. *Measuring instructional resources: The status of recent work* (Working Paper for The National Center for Education

Statistics and MPR Associates, Inc.). Washington, DC: Policy Studies Associates.

Mullens, J. E., Leighton, M. S., Turnbull, B. J., Weiner, L. K., & Williams, A. S. 1995. *Measuring instruction, curriculum content and instructional resources: The status of recent work* (Working Paper Series No. 95-11). Washington, DC: National Center for Education Statistics.

Muncey,D. E. & McQuillan, P. J. 1993. Preliminary findings from a five-year study of the Coalition for Essential Schools. *Phi Delta Kappan, 74(6),* 486-489.

National Center for Education Statistics (NCES). 1995. *Programs and plans of the National Center for Education Statistics.* Washington, DC: US Department of Education.

National Center for History in the Schools (NCHS). 1994. *National Standards for United States History.* Los Angeles, CA: NCHS.

National Council for Social Studies Task Force on Standards for Teaching and Learning in the Social Studies. 1995. *A vision of powerful teaching and learning in the social studies: Building social understanding and civic efficacy.* Washington, DC: NCSS.

National Council of Teachers of Mathematics (NCTM). 1989. *Curriculum and evaluation standards for school mathematics.* Reston, VA: NCTM.

National Council of Teachers of Mathematics (NCTM). 1991. *Professional standards for teaching mathematics.* Reston, VA: NCTM.

National Research Council. 1994. *Draft national science education standards* (summary). Arlington, VA: National Science Teachers Association.

Newmann, F. M. 1992. Higher-order thinking and prospects for classroom thoughtfulness. In: F. M. Newmann (Ed.), *Student engagement and achievement in American secondary schools.* New York: Teachers College Press, pp.62-91.

Newmann, F. M. & Wehlage, G. G. 1995. *Successful school restructuring: A report to the public and educators by the Center on Organization and Restructuring of Schoools.* Madison, WI: University of Wisconsin.

Oakes, J. 1985. *Keeping track: How schools structure inequality.* New Haven: Yale University Press.

Porter, Andrew C. 1991. Creating a system of school process indicators. *Educational Evaluation and Policy Analysis*. 13(1), 13-29.

Porter, Andrew C. 1995. *Developing Opportunity-to-learn indicators of the content of instruction* (Progress Report). Madison, WI: University of Wisconsin-Madison, Wisconsin Center for Education Research.

Porter, A. C., Kirst, M. W., Osthoff, E. J., Smithson, J. L., & Schneider, S. A. 1993. *Reform Up Close: A classroom analysis* (Draft Final Report to the National Science Foundation on Grant No. SPA-8953446 to the Consortium for Policy Research in Education). Madison, WI: University of Wisconsin-Madison, Wisconsin Center for Education Research.

Porter, A. C. & Smithson, J. L. 1995. *Enacted curriculum survey items catalogue: Middle school and high school mathematics and science* (Catalog for the US Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics). Madison, WI: University of Wisconsin-Madison, Wisconsin Center for Education Research.

Rutherford, F. J., & Ahlgren, A. 1990. *Science for all Americans*. New York: Oxford.

Schmidt, W. H. & McKnight, C. C. 1995. Surveying educational opportunity in mathematics and science: An international perspective. *Educational Evaluation and Policy Analysis, 17(3)*, 337-354.

Schools and Staffing in the United States: A Statistical Profile, 1990-91, Appendix C: Technical Notes. Washington, D. C.: National Center for Education Statistics.

Shulman, L. 1986. Paradigms and research programs in the study of teaching: A contemporary perspective. In M.C. Wittrock (ed.)*Handbook of research on teaching, third edition*. New York: MacMillan.

Shulman, L. 1987. Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*, 1-22.

Stodolsky, S. S. 1988. *The subject matters: Classroom activity in math and social studies*. Chicago: University of Chicago Press.

Stodolsky, S. S. 1990. Classroom observation. In J. Millman and L. Darling-Hammond (Eds.), *The new handbook of teacher evaluation: Assessing elementary and secondary school teachers*. Newbury Park, CA: Sage.

Stodolsky, S. S., & Grossman, P. L. 1995. The impact of subject matter on curricular activity: An analysis of five academic subjects. *American Educational Research Journal*, 32(2),227-249.

Weiss, I. R. 1994. *A Profile of Science and Mathematics Education in the United States: 1993*. Chapel Hill, N. C.: Horizon Research, Inc.

Wiley, D. E. & Yoon, B. 1995. Teacher reports of opportunity to learn: Analyses of the 1993 California Learning Assessment System (CLAS). *Educational Evaluation and Policy Analysis, 17(3)*, 355-370.

Appendix 1
Sources of Surveys

Center on Organizing and Restructuring of Schools. Madison,WI. Teacher and Student Questionnaires, Spring, 1994.

Charting Reform: The Teachers' Turn, 1994. Chicago, IL: Consortium on Chicago School Research.

CPRE Reform-up-Close Study. 1989. Madison, WI: Consortium for Policy Research in Education.

CPRE Upgrading Mathematics Study. 1992. Madison, WI: Consortium for Policy Research in Education.

CPRE School-Based-Management Study. 1993. Madison, WI: Consortium for Policy Research in Education.

CRC (Center for Research on the Context of Teaching.) 1994. Survey of elementary mathematics education in California. Teacher Questionnaire.

NAEP The Nation's Report Card. 1993. Washington, DC: Office of Educational Research and Improvement.

National Education Longitudinal Study of 1988 (NELS). 1988. Washington, DC: National Center for Education Statistics.

Schools and Staffing Survey 1993-94 School Year. 1993. Washington, DC: National Center for Education Statistics.

Schools and Staffing Survey Teacher Follow-Up Survey Questionnaire for Current Teachers 1994-95. Washington, DC: National Center for Education Statistics.

Teaching and Learning Conditions of the School and Classroom. 1995. Policy Studies Associates. Washington, DC: National Center for Education Statistics.

Third International Mathematics and Science Study. 1994. Chestnut Hill, MA: TIMSS Study Center.

Validating National Curriculum Indicators. 1993. Santa Monica, CA: RAND corporation.

Appendix 2
Items from TIMMS Teacher Questionnaire, Population 2
Items from CRC Survey of California Elementary Math Teachers

2. Many students have trouble relating ratios to fractions when they are asked to relate part of a set of objects to the whole set. For example, when asked *"There are 2 boys in a class for every 3 girls in the class. What fraction of the students are boys?"* Many students would answer 2/3 rather than 2/5. If you were working with a class in which many students had this kind of misunderstanding, what approach or sequence of approaches do you believe would best help students learn?

Place a '1' in the box in the right-hand margin next to the approach you believe to be the best. If you believe other approaches would also be acceptable, place a number in the box next to each one indicating the order in which you would consider using it. You need not choose more than one approach. Leave blank the box for any approach you do not consider acceptable.

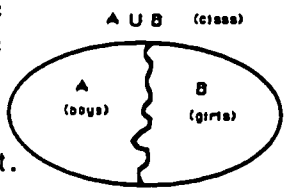
a) I would review with my students the section of the textbook that explains this concept. ..... ☐

b) I would make the situation more concrete by having the students help me make up the class roster for a class with two boys and three girls. From this class roster, I would then ask the students to work on finding a solution to the problem. ..... ☐

c) I would ask several students to explain their thinking about this problem and ask other students to comment on what seems helpful and not helpful with these explanations. If this did not clear up the difference in understandings, I would at least better understand my students' thinking and could choose activities to provide them with experiences that might lead them to the more conventional, useful idea. ☐

d) I would present several situations of this sort and after getting students to answer what fraction of the class were boys and what fraction girls, I would ask the students to use calculators to find what percent of the class were boys and what percent girls. Then I would ask them if the percentages of boys and girls in each class added to 100 percent. ..... ☐

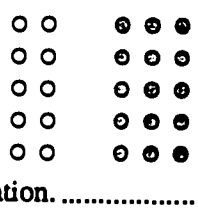
e) I would discuss which sets of objects that were involved in the situation with a diagram as the one shown at right and that the fraction needed is



$\frac{n(A)}{n(A \cup B)}$ which is not equal to ... $\frac{n(A)}{n(B)}$ A, B disjoint.

Many students do not even realize that the set A ∪ B is involved as well as set A and set B. ..... ☐

f) I would relate this kind of situation to the general idea of ratio as represented by discrete objects such as 2:3 which is represented, for example, by the diagram at right. Then I would investigate with students all the various fractions that could be made in such a situation. ..... ☐



g) Which of the approaches do you believe to be the least acceptable approach?

Place the letter of that approach in the box. ..... ☐

THANK YOU for the thought, time, and effort you have put into completing this questionnaire.

13. How would you begin a unit on fractions with your class? What would you do first?

_____

_____

_____

_____

_____

_____

What would you do next?

_____

_____

_____

_____

_____

14. Which of the following could be used to illustrate what 3/4 means? (CIRCLE ALL THAT APPLY.)

a.  1

b. • • •/• • •/• • •/o o o 2

c. Stand four children up in front of the room and place hats on three of them..... 3

d. None of these because_____ 4

_____

15. Which of the following story problems could be used to illustrate what 1 1/4 divided by 1/2 means? (CIRCLE ALL THAT APPLY.)

a. You want to split 1 1/4 pies evenly between two families. How much should each family get?..... 1

b. You have $1.25 and may soon double your money. How much money would you end up with?..... 2

c. You are making some homemade taffy and the recipe calls for 1 1/4 cups of butter. How many sticks of butter (each stick = 1/2 cup) will you need?..... 3

d. I'm not sure..... 4

e. None of these. Instead:_____ 5

_____

_____

Listing of NCES Working Papers to Date

Number	Title	Contact
94-01	Schools and Staffing Survey (SASS) Papers Presented at Meetings of the American Statistical Association	Dan Kasprzyk
94-02	Generalized Variance Estimate for Schools and Staffing Survey (SASS)	Dan Kasprzyk
94-03	1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report	Dan Kasprzyk
94-04	The Accuracy of Teachers' Self-reports on their Postsecondary Education: Teacher Transcript Study, Schools and Staffing Survey	Dan Kasprzyk
94-05	Cost-of-Education Differentials Across the States	William Fowler
94-06	Six Papers on Teachers from the 1990-91 SASS and Other Related Surveys	Dan Kasprzyk
94-07	Data Comparability and Public Policy: New Interest in Public Library Data Papers Presented at Meetings of the American Statistical Association	Carrol Kindel
95-01	Schools and Staffing Survey: 1994 papers presented at the 1994 Meeting of the American Statistical Association	Dan Kasprzyk
95-02	QED Estimates of the 1990-91 Schools and Staffing Survey: Deriving and Comparing QED School Estimates with CCD Estimates	Dan Kasprzyk
95-03	Schools and Staffing Survey: 1990-91 SASS Cross-Questionnaire Analysis	Dan Kasprzyk

Listing of NCES Working Papers to Date (Continued)

Number	Title	Contact
95-04	National Education Longitudinal Study of 1988: Second Follow-up Questionnaire Content Areas and Research Issues	Jeffrey Owings
95-05	National Education Longitudinal Study of 1988: Conducting Trend Analyses of NLS-72, HS&B, and NELS:88 Seniors	Jeffrey Owings
95-06	National Education Longitudinal Study of 1988: Conducting Cross-Cohort Comparisons Using HS&B, NAEP, and NELS:88 Academic Transcript Data	Jeffrey Owings
95-07	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
95-08	CCD Adjustments to the 1990-91 SASS: A Comparison of Estimates	Dan Kasprzyk
95-09	The Results of the 1993 Teacher List Validation Study (TLVS)	Dan Kasprzyk
95-10	The Results of the 1991-92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation	Dan Kasprzyk
95-11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
95-12	Rural Education Data User's Guide	Samuel Peng

Listing of NCES Working Papers to Date (Continued)

Number	Title	Contact
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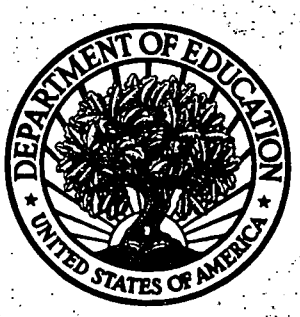
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
95-15	Classroom Instructional Processes: A Review of Existing Measurement Approaches and Their Applicability for the Teacher Follow-up Survey	Sharon Bobbitt
95-16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-17	Estimates of Expenditures for Private K-12 Schools	Steve Broughman
95-18	An Agenda for Research on Teachers and Schools: Revisiting NCES' Schools and Staffing Survey	Dan Kasprzyk
96-01	Methodological Issues in the Study of Teachers' Careers: Critical Features of a Truly Longitudinal Study	Dan Kasprzyk
96-02	Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association	Dan Kasprzyk
96-03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
96-04	Census Mapping Project/School District Data Book	Tai Phan

Listing of NCES Working Papers to Date (Continued)

Number	Title	Contact
96-05	Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey	Dan Kasprzyk
96-06	The Schools and Staffing Survey (SASS) for 1998-99: Design Recommendations to Inform Broad Education Policy	Dan Kasprzyk
96-07	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk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