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PRECISION TEACHING:

An Alternative to the Information Gap

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has been achieved by different age groups and different nationalities in a gaming situation. The complexity of today's world demands that educators continue to experiment and utilize new and meaningful techniques in the classroom.

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PRECISION TEACHING:

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At the recent meetings of the American Psychological Association, the senior author participated in a symposium entitled "Applied Behavioral and Social Sciences: Interactions between Producers and Users of Research." The central theme which emerged from the majority of the speakers' presentations will hardly come as a surprise to the readers of *People Watching*:

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there is an abysmal lack of communication between "producers" and "consumers" of research. Tens of millions of dollars are spent each year in support of research programs, both pure and applied, in the hopes that new information or techniques will emerge that will afford prompt assistance to those variously involved in the management of society—clinicians, teachers, administrators, politicians, to name but a few. These people, the potential consumers of the research "product," are not being served; the output of this massive research enterprise is having negligible impact

on the lives of those whose problems are ostensibly being subjected to scientific solution.

The field of education—most familiar both to ourselves and to our readers—is an excellent case in point. It is instructive to poll any handy group of classroom teachers concerning the frequency of their reference to any of the class of periodicals typified by, say, *The American Educational Research Journal* or *The Journal of Educational Psychology*. The usual frequency with which teachers report referring to such sources for information of immediate value in their professional pursuits is, not unexpectedly, zero.

This finding is not surprising when one reflects on a few of the more obvious variables controlling the generation and dissemination of educational research. First, it must be recognized that the bulk of educational research is academic; that is, it is done by persons connected in some way with institutions of higher learning. The rewards for doing research while connected with an institution of higher learning are of two general varieties: those dispensed by the institution in the form of promotions, pay raises, and so on, and those dispensed by one's professional colleagues in the form of literature citations, invitations to appear on symposia, and not infrequently, the opportunity to sit in judgment of the efforts of one's peers, such as by serving on editorial boards or research review panels for various funding agencies. The ultimate consumer of educational research—classroom teachers and school administrators—are not among those in control of the reward system for the academic researcher and he, therefore, quite naturally fails to address the results of his inquiries to that audience. Rather, he writes to an audience composed primarily of his peers seeking, as a rule, to impress them with the elegance of his methods, the breadth and depth of his scholarship, or the ingenuity of his definition of the dependent variable. One searches in vain for reference to the number of teachers or children now being helped by a particular research finding!

This research production-dissemination system is not as completely closed as the

foregoing analysis would suggest. To be sure, there are those who periodically synthesize the "primary literature" into secondary sources such as textbooks. Here again, however, essentially the same payoff system is operating; royalties are dependent upon adoptions which are in turn a function of impressing one's colleagues with the value of one's work. The closed loop of information transmission is broken, however, to the extent that students, albeit under duress, read and absorb the contents of such secondary sources and later, in their professional careers, attempt to apply information thus acquired. We may comment on the recency and the relevance of such information by noting that 8 to 10 years intervene between the time of a significant discovery and its implementation by a new generation of classroom teachers. A more efficient system of information transmission seems warranted.

There are, of course, other channels through which the products of educational research are transmitted to the consumers. News of an important educational innovation occasionally finds its way to a point somewhere near the top of the pyramid of educational administration at the local or state level. Consultants, usually in the person of the innovator and his immediate subordinates, are called in to conduct workshops designed to acquaint the highest level of administration with the significance and import of the innovation in question. Assuming the highest levels of administration are favorably persuaded, there is immediate activation of a descending linear communication chain through which the good news travels from link to link, with each link processing and amending the news according to its own particular needs, until it finally reaches its ultimate destination—the classroom teacher—in the form of a directive from the principal which usually begins, "Henceforth . . ." Teachers rightly regard the end result of this process as being somewhat less than totally satisfying of their needs since to them the entire process results only in an unexplained increase in their work load.

We think it is clear, then, that the principle barrier separating producers and consumers of educational research is one of communication. There are no direct channels which enjoy institutional support and those indirect channels which do exist may be characterized as starkly inefficient and ineffective, consisting as they do of a number of insular layers, each with its own filters and competing signal generators which act to impede the transmission of information across them. In other words, language and communication systems have been set up to enable researchers to talk to researchers, academic administrators to talk to academic administrators, agencies to talk to agencies, superintendents to superintendents, principals to principals, teachers to teachers, and children to children. Within each level, communication seems to be quite efficient; the greater the number of levels which must be crossed, however, the greater the likelihood of a message getting lost in transit.

How, then, is the consumer of educational research—the teacher—ever to be able to communicate with the producer—the educational researcher? The answer, which we propose to elaborate and illustrate in the balance of this paper, is surprisingly simple; they must become the same person! Teachers and administrators who want answers to such questions as "What is the best reading curriculum for our sixth graders," "What is the best way to curb David's tendency to fight on the playground," "Should the first graders write with over-sized pencils," "What is the local predictive validity of the Iowa Achievement Test," or "Does Bruner's *Man, a Course of Study* generate more new ideas among students than the local newspaper?" must begin answering these questions themselves. They will find that it is both easy and fun to find immediate, scientifically exact answers to these and many other questions if they will but shift their reference authority from one which has been both stingy and inaccurate—the educational research establishment—to one which is generous, highly accurate, and in no danger of depletion. We are

referring, of course, to the ultimate authority on matters of educational science—the children themselves.

During the past several years, a number of innovative teachers and administrators have begun doing exactly this—turning systematically to their own children for answers to questions about tactics and strategies for best educating those children. Their efforts have, in the main, been stimulated and coordinated by Dr. Ogden R. Lindsley of the University of Kansas and his associates around the country.

As children, teachers, parents, and administrators began, in greater and greater numbers, successfully finding their own answers to the sorts of questions about behavior and behavior change which are, in the final analysis, at the core of all educational research, the need for a standardized medium of communication became apparent if these people were to share their discoveries with one another without experiencing the same breakdown in communication that had occasioned this collective innovation in the first place. This problem was met and successfully solved in two ways: first, a Standard Behavior Chart was devised upon which the frequency (number per minute) of any human behavior could be recorded on a daily basis. Use of this chart insured that everyone wishing to share behavioral data would be able to do so in a uniform and standardized format while in no way being restricted as to the type or variety of behavior that could be studied. Indeed, it has been found that children as young as preschool level can be taught to accurately record their own behavior frequencies on the Standard Behavior Chart (Bates & Bates, 1971) and thus share this information, without ambiguity, with any person anywhere who is familiar with the chart. The second strategy for insuring effective communication is manifested by the conscious decision to use plain, spoken English to describe those variables and procedures responsible for behavior changes registered on the Standard Chart. By discouraging the use of jargon of special interest groups, people at all levels from parent to principal, and from child to chairman of the school board, can

communicate with the exactness built into the mother tongue and about any chartable matters of mutual concern.

To illustrate and further amplify the use of these techniques (which are now collectively described by the general phrase, Precision Teaching), we would like to share with our readers three representative charts which emerged from our efforts to let our sixth graders help us answer a question concerning the effectiveness of a programmed language arts curriculum.

During the first week of March 1971, the sixth graders at Duval Elementary School were grouped into four homogeneous ability groups with respect to their reading proficiency. Our group was selected for exposure to the semiprogrammed workbook, *Reading, Spelling, Vocabulary and Pronunciation* (Lewis, 1967). The 29 students in our group had already been taught to use the

Standard Chart to record their own performance in various subjects (Ellis, 1971) and were not surprised at our suggestion that they chart their progress in RSVP.

Figures 1, 2, and 3 are, respectively, charts of Peggy's, Patricia's, and Heidi's subsequent performance on various parts of the booklet. On each chart the dots represent frequencies of items correctly answered while the X's are incorrect frequencies. The dashed line across each chart at .03 denotes the record floor: on days that the children worked on this material, they worked for 30 minutes. Hence, we are unable to observe daily frequencies below 1/30 or .033.

All children performed on one session each for Units 1 and 2. It can be seen from the charts that all three children performed more rapidly on unit 2 but only Patricia showed a substantial increase in performance accuracy (the separation of the correct and incorrect

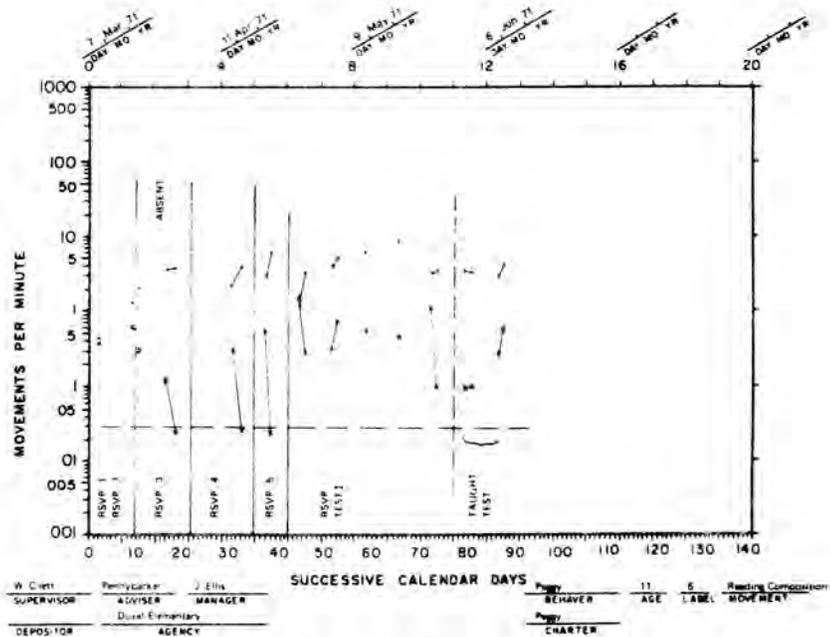


Figure 1. Peggy's RSVP performance chart.

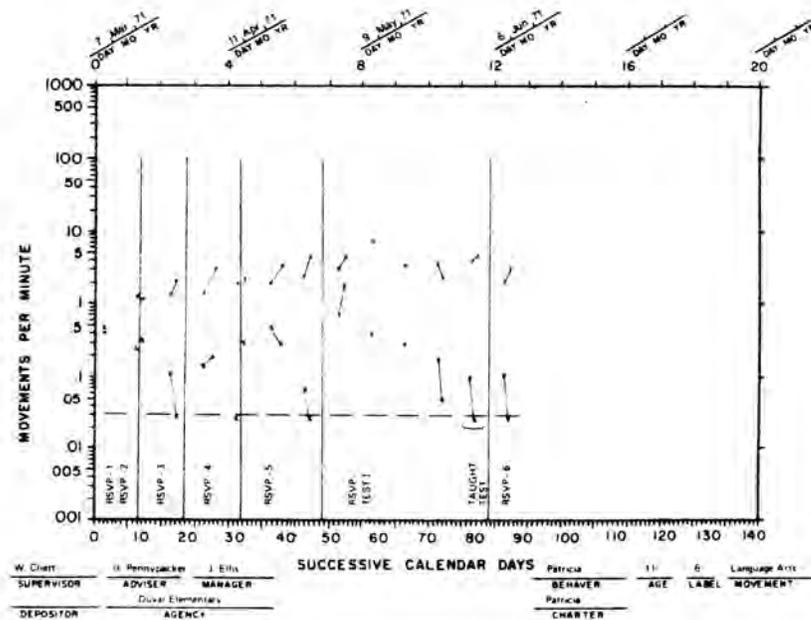


Figure 2. Patricia's RSVP performance chart.

frequencies). On the basis of this evidence, the decision was made to let each child continue performing on a particular unit until he could do it without error. Inspection of the charts shows that for these children, from 2 to 5 tries were all that were required to provide each child with this degree of success on Units 3, 4, and 5. This finding is representative of the data for the other 26 children in the group.

Following Unit 5, the RSVP Workbook has a review test, which, according to the author, "thoroughly reviews the (material) of the preceding five lessons . . ." If this is the case, one would expect the children to progress through the review test with at least the ease that they achieved mastery of the preceding units. Of the three children whose charts we are presenting, only Heidi found the test comparable in difficulty to the previous material, and even for her the accuracy of her initial try was lower than her initial try

accuracy on all units except the first. As it became apparent that the children were having undue difficulty in reaching the same performance criterion on the review test that they had reached on the initial exposure to the material being reviewed, it was decided, where necessary, "to teach the test" in order to help the children experience the success they had become accustomed to without further unnecessary delay. The reader can verify that this tactic was successful with Patricia but that more time than remained in the school year would have been required for Peggy to generate an errorless performance. Again these observations are representative of the experiences of the other members of the group whose charts are not presented here.

What may we conclude from these data? First, that requiring the children to be errorless on a given unit before progressing to the next unit generates rapid improvement

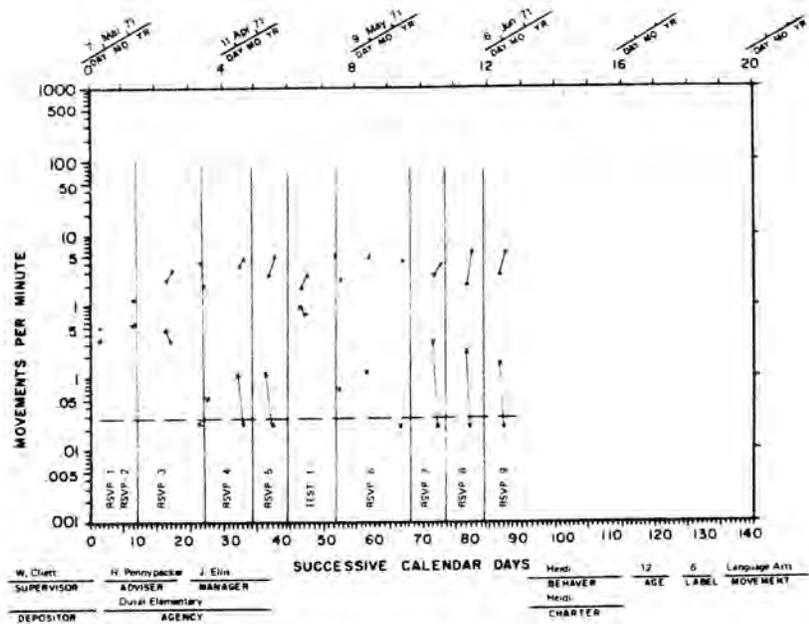


Figure 3. Heidi's RSVP performance chart.

within each unit. Second, the children are telling us that the review tests are not to be regarded as equivalent to the material being reviewed, and that perhaps more efficient use of these materials would involve skipping the review units entirely or, alternatively, treating them as one traditionally treats tests by allowing only one opportunity to perform on each of them.

It would be misleading to leave readers with the impression that our primary reason for having the children chart this performance was to provide the foregoing evaluation of the curriculum. In point of fact, our discovery of the apparent discontinuity between the behavioral requirements of the practice units and the review test is a happy bonus which we reaped in addition to the more fundamental benefit of charting: a daily individual record of each child's relevant behavior which serves as a basis for making and evaluating educational

decisions and, incidentally, leaves us with a precise, permanent record of each child's growth and achievement.

Use of the Standard Behavior Chart and reliance upon basic English as our technical language permits free, easy, and efficient communication with anyone inclined to share in experiences within this format. To achieve the ultimate in efficiency, however, a means had to be found for rapid storage, analysis, synthesis, and retrieval of all information generated in this format. This need is being met by a facility known as the Behavior Bank (Koenig 1971) which is a system of computers that performs exactly these four functions. Space does not permit a full description of the range of capabilities and services provided by the Behavior Bank. Suffice it to say, that when deposited, the details of the three charts we have shared along with those of the other 26 that could not be presented here, together with

a full description (in plain English) of the conditions under which these data were gathered, will become available to all other depositors of data in the Bank. In addition, our data can be compared with similar data collected in other parts of the country and questions concerning the generality of our findings may be answered immediately. For example, we may inquire as to whether the effects we have observed are, within the range of information available at the time of our query, peculiar to the RSVP material or characteristic of other programmed or semiprogrammed materials and, if so, which ones and under what conditions.

Answers to these and many other questions are the inevitable and immediate consequence of (1) an ever-broadening data base, and (2) a simplified, standardized, and precise format for communication. There is reason, therefore, to be optimistic about the future of meaningful and practical research in education. A means now exists whereby teachers, children, parents, and administrators can readily provide answers to their immediate local questions while, at the same time, performing the increasingly necessary function of accurate and precise evaluation. Further, if they choose, they may share their findings with literally thousands of other people. In this fashion, a truly empirical and humane science of education will rapidly develop; empirical because it is based on directly observed and recorded data as opposed to theories and hunches—humane because the data are collected and shared in the broadest spirit of cooperation with the single ultimate purpose of helping children.

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