DOCUMENT RESUME

ED 236 845 EC 160 863

AUTHOR Skiba, Russell; And Others
TITLE The Non-Effect of Process-Product Variables in Resource Classrooms.
INSTITUTION Minnesota Univ., Minneapolis. Inst. for Research on Learning Disabilities.
SPONS AGENCY Office of Special Education and Rehabilitative Services (ED), Washington, DC.
REPORT NO IRLD-RR-121
PUB DATE Jun 83
CONTRACT 300-80-0622
NOTE 37p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; *Disabilities; Elementary Education; Prediction; Resource Room Programs; Success; *Teaching Methods

ABSTRACT

To test the efficacy of variables found effective in regular classrooms (in previous process-product research), variables were observed for 126 elementary school children in 17 resource classrooms. Measurement of teacher structure and student achievement was performed. Results indicated that, although most of the variables were used to at least a moderate degree in most classrooms, only the frequency with which students responded correctly consistently predicted performance on reading achievement measures. In contrast to regular settings, in which it has been suggested that a level of success that is too high may decrease student motivation, the study indicated that the higher the rate of correct answers the better the results in terms of achievement. Findings provided a caution in the generalization of process-product research to special education. (Author/CL)

University of Minnesota

Research Report No. 121

THE NON-EFFECT OF PROCESS-PRODUCT VARIABLES IN RESOURCE CLASSROOMS

Russell Skiba, Bonita Sevcik, Caren Wesson,
Robert King, and Stanley Deno

IRLD

Institute for Research on Learning Disabilities

IRLD

Director: James E. Ysseldyke

The Institute for Research on Learning Disabilities is supported by a contract (300-80-0622) with the Office of Special Education, Department of Education, through Title VI-G of Public Law 91-230. Institute investigators are conducting research on the assessment/decision-making/intervention process as it relates to learning disabled students.

During 1980-1983, Institute research focuses on four major areas:

- Referral
- Identification/Classification
- Intervention Planning and Progress Evaluation
- Outcome Evaluation

Additional information on the Institute's research objectives and activities may be obtained by writing to the Editor at the Institute (see Publications list for address).

The research reported herein was conducted under government sponsorship. Contractors are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent the official position of the Office of Special Education.

Research Report No. 121

THE NON-EFFECT OF PROCESS-PRODUCT VARIABLES IN RESOURCE CLASSROOMS

Russell Skiba, Bonita Sevcik, Caren Wesson,
Robert King, and Stanley Deno
Institute for Research on Learning Disabilities
University of Minnesota

June, 1983

Abstract

Process-product research has been successful in identifying effective teaching variables in the regular classroom; little research in this area has been done with students in special settings, however. In order to test the efficacy of variables previously found effective in regular classrooms, a number of these variables were observed for 126 elementary school children in 17 resource classrooms. Results indicated that, although most of the variables were used to at least a moderate degree in most classrooms, only the frequency with which students responded correctly consistently predicted performance on reading achievement measures. Implications for further process-product research in special classrooms are discussed.

The Non-Effect of Process-Product Variables in Resource Classrooms

In the past two decades, the observational study of teaching has produced significant gains in identifying teaching strategies and behaviors that are effective in promoting student achievement (Bloom, 1980). Correlating data obtained from direct observation of classroom teaching with student outcomes, process-product studies have isolated a number of teaching variables that consistently bear a positive relationship to student achievement (Stevens & Rosenshine, 1981). At a time when the effectiveness of public education is being seriously called into question (National Commission on Excellence in Education, 1983), these new findings offer the possibility of more effective classroom management and teaching strategies.

Comparisons of both effective and ineffective teachers (Good & Grouws, 1977) and high and low achieving schools (Frederick, 1977) revealed that student learning is most facilitated in classrooms with a high degree of structure and teacher-directed activities. In a study of second and fifth grade classrooms, the Beginning Teacher Evaluation Study (Fisher, Berliner, Filby, Marliave, Cahen, & Dishaw, 1980) found that both the amount of time allocated to student instruction by the teacher, and the proportion of that time the student was actively engaged in learning correlated positively with student performance on achievement tests. Stallings (1975) reported strong relationships between a number of measures of academic engagement and student achievement. In a review of observational classroom research, Stevens and Rosenshine (1981) concluded that teachers who have proven more successful in promoting learning gains have been those most in control of the learning process:

> that is, they selected and directed the academic activities, approached the subject matter in a direct businesslike way, organized learning around questions they posed, and occupied the center of attention. In contrast, the less successful teachers made the students the center of attention, organized learning around the students' own questions, and joined or participated in students' activities. (p. 2)

The characteristics of the instruction that students receive also have been explored in relation to academic outcomes. Instructing teachers to demonstrate skills to be learned, guide and prompt the students as they are learning the skills, and provide time for independent practice produced significant performance improvements among students (Good & Grouws, 1977). Such controlled practice may be most effective when it consists primarily of factual single-answer questions (Soar, 1973) and is accompanied by frequent teacher feedback concerning the correctness of responses (Anderson, Evertson, & Brophy, 1979; Fisher et al., 1980).

Practice has been found to be most beneficial when it is related directly to the subject-matter and allows the student to experience a moderate to high rate of success. Thus, Leinhardt, Zigmond, and Cooley (1980) reported that silent practice in reading correlated most strongly with reading achievement for resource room students; Stallings (1975) found similar results for both oral and silent practice. One of the more important findings of the Beginning Teacher Evaluation Study was that material that allows the student to experience a moderate to high rate of correct answers is most beneficial in promoting learning among elementary school children (Fisher et al., 1980).

Other characteristics of lesson presentation also may influence student achievement. Kounin (1970) first identified the importance of

smoothness and momentum in effective teaching. The importance of a brisk instructional pace has received some empirical support. Both Stallings (1975) and Anderson et al. (1979) reported that the frequency of academic interactions per minute related significantly to both reading and math achievement. In addition, the more individualized instruction is, the more effective it has been found to be in promoting student academic achievement (Glass & Smith, 1978; Stevens & Rosenshine, 1981).

While many of the above findings are based primarily on correlational studies, a large body of experimental evidence supports the effectiveness of reinforcement, especially token systems, in special classrooms. Token economies have been implemented in a variety of settings, and have been found effective in decreasing disruptive behavior and shaping appropriate behavior across a wide range of populations (Kazdin, 1977; O'Leary & Drabman, 1971). In a quantitative synthesis of 5000 studies, Lysakowski and Walberg (1981) found the general effect of reinforcement on classroom learning to be "moderately large and fairly robust," and especially effective in special education settings. Specific studies utilizing social reinforcers such as praise have produced more inconsistent results, however, in some cases correlating negatively with achievement test results (Good & Grouws, 1977). Brophy (1981) argued that teacher praise does not always function as a reinforcer, and that further study is necessary to determine its effectiveness.

Although it has achieved some success in describing effective teaching, process-product research has yet to resolve a number of

methodological problems. Thus far, the investigations have been primarily correlational, providing no evidence concerning the direction of causation (Good & Grouws, 1977); and attempts to study the observed variables experimentally have met with only modest success (Anderson et al., 1979). In addition, process-product research thus far has relied primarily on standardized achievement tests for its dependent measures, and the reliability, validity and standardization of such measures is often suspect (Salvia & Ysseldyke, 1981). The large majority of such studies have examined only teachers and students in regular classrooms, and those that have attempted to apply the findings to special populations have not always replicated the results (Thurlow, Graden, Greener, & Ysseldyke, 1982). In fact, a large proportion of the observational instruments used in process-product research have failed to provide results generalizable over time and classrooms, even within regular classroom settings (Shavelson & Dempsey-Atwood, 1976). Finally, since cognitive entry variables are estimated to account for up to 60% of post-test achievement variance, the correlations between teaching behaviors and student outcomes have been relatively small, typically accounting for only 8% to 15% of the variance (Borg, 1980).

The purpose of the current study was to investigate the usage and effectiveness of specific teaching behaviors in the resource room setting. The degree to which such strategies were implemented in resource classroom settings, as well as the stability of such teaching behaviors over time was investigated. Finally, the relationship of the variables identified through process-product research to student achievement in special education classrooms was explored.

Method

Subjects

The subjects for all statistical analyses were 126 grade 1-8 resource room students in four rural and suburban Minnesota school districts. All subjects were participants in research on the effectiveness of direct and frequent curriculum-based measurement and evaluation system. Of the 126 students, 99 were receiving the experimental treatment, while 27 were not receiving data-based services. The distribution of students by grade is presented in Table 1; the mean age was 9.5. The sample included 105 boys and 21 girls. The 35 teachers participating in the study had spent a mean of 2.04 years teaching regular education and 4.89 years teaching special education.

Insert Table 1 about here

Measures

Three measures were used to collect data: one for structure, and two for achievement. The structure of the individual student's instruction was assessed by means of the Structure of Instruction Rating Scale (Deno, King, Skiba, Sevcik, & Wesson, 1983). Achievement measures included timed samples from three third grade passages (Deno, Mirkin, Chiang, & Lowry, 1980), and four subtests of the Stanford Diagnostic Reading Test (SDRT).

Achievement measures. At three different points in time during the study, three one-minute oral reading measures, consisting of

randomly selected passages from the third grade level in Ginn 720, were administered to the students. These measures were selected based on their technical adequacy (Deno et al., 1980) and sensitivity to change (Marston, Lowry, Deno, & Mirkin, 1981). These curriculum-based measures had been found to be as reliable and valid as traditional standardized tests, yet more likely to reflect small increments of improvement. The measurements were conducted by directing students to begin reading at the top of the page and continue reading for one minute, at which time the examiner would say stop. If they came to a word they did not know, the examiner would supply the word and prompt them to continue. While the student was reading, the examiner followed along on a copy of the passage and marked errors of substitution and omission. Following the reading, the numbers of words read correct and incorrect were counted and recorded, with no feedback given to the student. These three reading measures were given at the beginning of the study (pretest), in the middle, and immediately following the final observation (posttest).

Two subtests from the Stanford Diagnostic Reading Test (Karlsen, Madden, & Gardner, 1976) also were given as posttest measures. The Structural Analysis and Reading Comprehension subtests were administered along with the final reading passage measures. Each of these subtests has two parts, with Structural Analysis focusing on syllabication (blending and division) and Reading Comprehension focusing on answering both literal and inferential questions for previously read passages.

Structure of instruction rating scale (SIRS). The Structure of Instruction Rating Scale (SIRS) was designed to measure the degree of

structure of the instructional lesson that a student received. The selection of variables for the instrument was based on current research findings. The variables included in the SIRS, their operational definitions, and the rating scale format are included in Appendix A. The SIRS, as originally constituted, included only the first 10 variables, and only these variables were observed for the first data collection. The variables Oral Practice and Silent Practice were added after the first data collection: thus, the SIRS consisted of 12 variables for the second and third data collections.

Two rounds of pilot data were collected, analyzed, and refined to develop the initial 10 variables. It should be noted that the operational definition of the variable Positive Consequences did not include teacher praise. Teacher praise was excluded because of evidence suggesting that the reinforcing value of teacher praise still needs to be empirically validated (Brophy, 1981).

The SIRS purposely was designed to focus on the instruction a student receives, rather than focusing on the teacher. This approach was taken because it is possible, and even likely, that the behaviors of a teacher toward a group of students may in fact be differentially effective with individual students. Since special education focuses on the individual, the individual instructional program was selected as the target for measurement rather than the teacher.

The SIRS consists of 12 five-point rating scales. A rating of 1 is low for the variable and 5 is high. Observers, trained by videotape to a criterion of .80-.90 inter-rater agreement, rated all variables on the basis of strict definitions at the end of a 20-minute

observation period. For the current study, nine research assistants were trained as observers and reached a mean inter-rater agreement level of .92 before actually observing in the classroom.

The reliability of the SIRS was assessed by means of Cronbach's alpha, a measure of internal consistency, as recommended by Haynes (1978). For the three observation sessions, the mean inter-item correlations were .33, .22, and .29, resulting in alphas of .84, .76, and .81. Thus, the scale evidenced reliability both in terms of inter-observer agreement and internal consistency. Further details concerning rater training and technical characteristics may be found elsewhere (Deno et al., 1983).

Procedures

Observers visited classrooms three times during the course of the year: in November, soon after the implementation of the experimental treatment, in February, and in May, at the end of the school year. Raters were instructed to observe the individual student for 20 minutes and then make their ratings. Although directed not to rate during the observation, so as to ensure a more global rating, raters were encouraged to refer to the operational definitions to provide a structure for the observation.

Reading passage data also were collected three times during the year, within two weeks of each observation. The Stanford Diagnostic Reading Test was administered as a post-test in May.

Design

Stability of teacher behaviors was assessed by correlating each variable on the SIRS across observation sessions. Such estimates

provided not only an estimate of the stability of teaching behavior, but also an estimate of the consistency of the scale over time.

Since teacher structuring behaviors had been found to be very stable across time for this population (Wesson, Deno, Mirkin, Sevcik, Skiba, King, Tindal, & Maruyama, 1982), the results of the three observations were aggregated before examining relationships with achievement. Such aggregation has been shown to increase stability and reduce measurement error (Gronlund, 1976). A series of regression analyses then was performed using the achievement measures as dependent measures and the SIRS variables as independent variables. Since school achievement has been shown to be correlate most highly with entering student ability (Bloom, 1976; Fisher et al., 1980), two methods of controlling for achievement were used. First, pretest achievement (as measured by passage data) was forced as the first independent variable for all regression analyses conducted on the scores obtained during the second and third data collections. Second, two gain scores were calculated: a score representing the absolute gain in words read per minute between the first and third timed passages, and the conversion of these absolute gain scores into percentage gain. Achievement was standardized by grade to control for age effects (except for gain scores, which were based on raw data); SIRS ratings were standardized by site to control for rater effects among sites.

Results

Teacher Use of the SIRS Variables

The means and standard deviations (see Table 2) indicated that the behaviors represented by the SIRS items are present in the

resource classrooms in varying degrees. Four of the variables--Frequency of Correct Answers, Corrections, Teacher Directed Learning, and Active Academic Responding--were consistently observed to a greater degree, as indicated by higher ratings. Teacher monitoring of independent practice, use of token economies, and silent reading practice were more often scored on the low end of the scale.

Insert Table 2 about here

Correlations among the variables. Since all SIRS items represented behaviors meant to be characteristic of effective teachers, one would expect some correlation among the variables. Yet correlations that were too high at any one observation session might evidence halo effects on the part of raters. Moderate correlations were obtained for the SIRS items at each observation time. Correlations ranged from -.26 to .76, with the majority in the .30's and .40's. Three of the variables, Active Academic Responding, Teacher Directed Learning, and Pacing, consistently evidenced strong correlations with one another.

Stability of the variables over time. For the most part, the teacher behaviors observed were fairly stable over time. Typical correlations between different observations of the same teacher behavior ranged from .27 to .45, the great majority being significant at $p < .001$. Of the 12 SIRS variables, only Controlled Practice (time 1 to time 3) and Positive Consequences (time 2 to time 3) showed inter-session correlation not to be significant (at least $p < .05$).

Structure and Achievement

Results of the regression of SIRS variables on various achievement measures after controlling for entering achievement are presented in Table 3. The large proportion of variance accounted for by entering achievement is typical of such studies, as is the relatively low proportion of residual variance explained by teacher variables (Bloom, 1976; Borg, 1980).

Insert Table 3 about here

What differentiates these results from other such studies is the failure of the majority of the variables to positively predict achievement. Not only was Frequency of Correct Answers the only variable to achieve significant positive correlations with achievement measures, it was also the only variable to maintain a positive correlation with achievement across all measures. It also positively accounted for the largest proportion of residual variance (ranging from 1% to 8%) on all measures except percent gain of words read correctly from third grade passages.

Although aggregating ratings over observations should decrease measurement error and increase reliability, there is also the chance that averaging across time will wash out real differences in teaching behavior across time. Thus, multiple regression analyses of structure on achievement also were performed for the standardized data from the final data collection. The results proved very similar to the findings based on the aggregated data. Frequency of Correct Answers

was again the only variable to correlate consistently positively with achievement measures. In addition, Corrections correlated significantly negatively with both the third grade reading passages ($F=4.42$, $p=.039$), and the overall SDRT score ($F=1.53$, $p=.059$).

Discussion

In the past 10 years, observational study of teaching has provided a number of new insights concerning teaching. Techniques once thought essential to effective instruction, such as warmth or higher level instruction, have proven to be of only secondary importance in predicting student outcomes (Dunkin & Biddle, 1974). Perhaps more importantly, the recent body of process-product research has provided strong evidence for the importance of a highly structured learning environment in the regular classroom.

Still, generalizations from the regular classroom to special education must be made cautiously. Unless we assume that students referred to special settings are the product of poor teaching, it is evident that, perhaps for the majority of special education students, techniques that are ordinarily effective have failed to achieve the desired results. One would expect then, that a different set of conditions may be required to promote optimal student learning in the resource room.

Indeed, the different goals and conditions prevailing in special classrooms may make process-product research more difficult in such settings. The large, relatively homogeneous regular classroom tends to favor strategies that emphasize efficiency, that is, those that provide effective instruction to the greatest number of children. In

a special setting, where class sizes are small and students with more intense learning or behavior disorders may require a unique approach, effective instruction may need to be studied on an individual basis. In fact, given our current state of knowledge in special education, we do not know what will work with any given student (Deno & Mirkin, 1977). Thus, each program for each individual student must be viewed as an "educational experiment": new techniques must be tried and monitored until success is achieved.

The results reported in this investigation do provide support for the findings of Fisher et al. (1980) regarding the importance of a high success rate in learning new skills. Of the 12 variables studied, only the frequency with which the student gave correct answers correlated positively with measures of student achievement. Especially for students with a history of failure in the classroom, success in learning may be important in building the student's confidence in his/her own ability to do academic tasks. More simply, a high rate of success may act as a reinforcer that will make future attempts to learn more likely.

In contrast to regular settings, in which it has been suggested that a level of success that is too high may decrease student motivation (Fisher et al., 1980), the current findings are linear: the higher the rate of correct answers, the better the results in terms of achievement. Terrace (1963) introduced a similar idea in "errorless discrimination," and subsequent research has shown that mentally retarded subjects can be taught very complex tasks by initially providing a high degree of success on simpler tasks (Sidman

& Stoddard, 1967). A similar model in resource settings might suggest that material that is almost "too easy" for the student might initially be preferable, in order to provide a high rate of success. Once the student has experienced learning as reinforcing, it may be advisable to gradually introduce more challenging materials.

The current findings also provide a caution in the generalization of process-product research to special education. Several variables on the SIRS evidenced no relationship, or even a slightly negative relationship, to student outcomes. This may not, and likely does not, indicate that such variables are unimportant when working with special needs students. Results indicated that a number of the variables were used relatively widely across classrooms, and might differ in a sample that utilized these strategies to a lesser degree. What these findings indicate is that the qualities of generally effective teaching might predict student achievement in resource room settings only in conjunction with strategies specific to the resource room.

Ratings on all 12 SIRS scales demonstrated stability across time and rater. Rotation of observers over observation sessions ensures that such stability was more than just rater halo effect. These results are consistent with previous findings that high inference coding systems such as rating scales tend to be more stable across time and situations (Shavelson & Dempsey-Atwood, 1976). This does not necessarily argue for the superiority of high inference measurement, however. The stability of such systems may in part be due to the more general nature of category definitions; more precise and molecular coding categories might yield lower stability correlations (Haynes,

1978). Further research simultaneously using both high inference systems and low inference coding schemes, such as behavior counts, could provide a more definitive answer concerning whether observed stability in coding systems is merely a measurement artifact, or a function of the behavior itself.

Research that seeks to demonstrate links between teacher and student behavior has already contributed greatly to our understanding of the learning process, and will doubtless continue to be of great importance. Identification of "alterable" teaching variables (Bloom, 1980) may help provide guidelines in the remediation of learning and behavior disorders, especially if teachers can be trained easily to use such variables. Still, the present study argues that caution is advised in attempting to generalize the findings of process-product literature to special settings. Given the relative recency of the research methodology, and the complexity of resource classrooms, considerable study may be required before a definitive set of effective teaching strategies can be positively identified.

References

Anderson, L. M., Evertson, C. M., & Brophy, J. E. An experimental study of effective teaching in first-grade reading groups. Elementary School Journal, 1979, 79(4), 193-223.

Bloom, B. S. Human characteristics and school learning. New York: McGraw-Hill, 1976.

Bloom, B. The new direction in educational research: Alterable variables. Phi Delta Kappan, 1980, 61, 382-385.

Borg, W. R. Time and school learning. In C. Denham & A. Lieberman (Eds.), Time to learn. Washington, D.C.: National Institute of Education, 1980.

Brophy, J. Teacher praise: A functional analysis. Review of Educational Research, 1981, 51(1), 5-32.

Deno, S. L., King, R., Skiba, R., Sevcik, B., & Wesson, C. The Structure of Instruction Rating Scales (SIRS): Development and technical characteristics (Research Report No. 107). Minneapolis: University of Minnesota, Institute for Research on Learning Disabilities, 1983.

Deno, S. L., & Mirkin, P. K. Data-based program modification: A manual. Minneapolis: Leadership Training Institute, 1977.

Deno, S. L., Mirkin, P. K., Chiang, B., & Lowry, L. Relationships among simple measures of reading and performance on standardized achievement tests (Research Report No. 20). Minneapolis: University of Minnesota, Institute for Research on Learning Disabilities, 1980.

Dunkin, M. J., & Biddle, B. J. The study of teaching. NY: Holt, Rinehart & Winston, 1974.

Fisher, C. W., Berliner, D. C., Filby, N. N., Marliave, R., Cahen, L. S., & Dishaw, M. M. Teaching behaviors, academic learning time, and student achievement: An overview. In C. Denham & A. Lieberman (Eds.), Time to learn. Washington, D.C.: National Institute of Education, 1980.

Frederick, W. C. The use of classroom time in high schools above or below the median reading score. Urban Education, 1977, 11, 459-464.

Glass, G. V., & Smith, M. L. Meta-analysis of research on the relationship of class size and achievement. Boulder: University of Colorado, Laboratory of Educational Research, 1978.

Good, T. L., & Grouws, D. A. Teaching effects: A process-product study in fourth grade mathematics classes. Journal of Teacher Education, 1977, 28, 45-50.

Gronlund, N. E. Measurement and evaluation in teaching. New York: MacMillan, 1976.

Haynes, S. N. Principles of behavioral assessment. New York: Gardner Press, 1978.

Karlsen, B., Madden, R., & Gardner, E. F. Stanford diagnostic reading test. New York: Harcourt Brace Jovanovich, 1976.

Kazdin, A. E. The token economy: A review and evaluation. New York: Plenum, 1977.

Kounin, J. S. Discipline and group management in classrooms. New York: Holt, Rinehart & Winston, 1970.

Leinhardt, G., Zigmond, N., & Cooley, W. Reading instruction and its effects. American Educational Research Journal, 1981, 18(3), 343-361.

Lysakowski, R. S., & Walberg, H. J. Classroom reinforcement and learning: A quantitative synthesis. Journal of Educational Research, 1981, 75, 69-77.

Marston, D., Lowry, L., Deno, S., & Mirkin, P. An analysis of learning trends in simple measures of reading, spelling, and written expression: A longitudinal study (Research Report No. 49). Minneapolis: University of Minnesota Institute for Research on Learning Disabilities, 1981.

National Commission on Excellence in Education. Open letter to the American people, April, 1983.

O'Leary, R. D., & Drabman, R. S. Token reinforcement programs in the classroom: A review. Psychological Bulletin, 1971, 75, 379-398.

Salvia, J., & Ysseldyke, J. Assessment in special and remedial education. Boston: Houghton Mifflin, 1981.

Shavelson, R. J., & Dempsey-Atwood, N. Generalizability of measures of teaching behavior. Review of Educational Research, 1976, 46, 553-611.

Sidman, M., & Stoddard, L. T. The effectiveness of fading in programming a simultaneous form discrimination for retarded children. Journal of the Experimental Analysis of Behavior, 1967, 10, 3-15.

Soar, R. S. Follow through classroom process measurement and pupil growth (1970-71): Final report. Gainesville, Fla: University of Florida Institute for Development of Human Resources, College of Education, 1973.

Stallings, J. Implementation and child effects of teaching practices in Follow Through classrooms. Monographs of the Society for Research in Child Development, 1975, 40 (7-8, Serial No. 163).

Stevens, R., & Rosenshine, B. Advances in research on teaching. Exceptional Education Quarterly, 1981, 2(1), 1-10.

Terrace, H. S. Discrimination learning with and without "errors". Journal of the Experimental Analysis of Behavior, 1963, 6, 1-27.

Thurlow, M. L., Graden, J., Greener, J. W., & Ysseldyke, J. E. Academic responding time for LD and non-LD students (Research Report No. 72). Minneapolis: University of Minnesota Institute for Research on Learning Disabilities, 1982.

Wesson, C., Deno, S., Mirkin, P., Sevcik, B., Skiba, R., King, B., Tindal, G., & Maruyama, G. Teaching structure and student achievement effects of curriculum-based measurement: A causal (structural) analysis (Research Report No. 105). Minneapolis: University of Minnesota, Institute for Research on Learning Disabilities, 1982.

Table 1

Breakdown of Subjects by Grade

Grade	Percent of Subjects
1	4.9
2	17.9
3	23.6
4	23.6
5	20.3
6	7.3
7	1.6
8	.8

Table 2

Means and Standard Deviations for the Aggregated SIRS Variables[a]

	$\bar{X}$	(SD)
Instructional Grouping	3.59	(1.020)
Teacher Directed Learning	4.11	(0.765)
Active Academic Responding	4.10	(0.771)
Demonstration and Prompting	3.20	(0.768)
Controlled Practice	3.70	(0.898)
Frequency of Correct Answers	4.15	(0.588)
Independent Practice[b]	2.22	(1.067)
Corrections	4.23	(0.747)
Positive Consequences	1.81	(1.017)
Pacing	3.78	(0.872)
Oral Reading Practice[c]	3.02	(1.080)
Silent Reading Practice	2.08	(0.854)

[a]All scales are 5 point scales; a rating of 1 represents low usage, a rating of 5 high usage

[b]N=88; for all other scales N=126.

[c]Oral Reading Practice and Silent Reading Practice were observed only during the second and third observation sessions. The means for these variables represent aggregation over only two occasions.

Table 3

Summary of Regression of SIRS Variables on Achievement Measures (N = 89)

	Proportion of Variance Accounted for by Pretest Achievement[a]	SIRS Variables with Significant Beta-weights ($p < .10$)[b]	Sign	Proportion of Residual Variance[c]	Proportion of Residual Variance Accounted for by All SIRS Variables[d]
Passage Score - Time 2	.68	Frequency of Correct Answers	(+)	.01	.03
Passage Score - Time 3	.54	--		--	.02
SDRT - Comprehension Subtests	.07	--		--	.11
SDRT - Structural Analysis Subtests	.23	Positive Consequences	(-)	.02	.08
SDRT - Total Score	.17	--		--	.11
Passage Gain Score[b]	--	Frequency of Correct Answers	(+)	.03	.08
Percent Gain	--	--		--	.08

[a] The passage score at time 1 was used to control for entering achievement.

[b] Gain in words read per minute from the third grade passages from time 1 (October) to time 3 (May).

[c] The proportion of the residual variance accounted for by the variable listed in Column 2, where residual variance refers to the variance remaining, in the post-achievement measure after entering achievement at time 1.

[d] The proportion of the residual variance accounted for by all SIRS variables after accounting for pre-achievement.

Appendix A

Structure of Instruction Rating Scale (SIRS)

School:_____ Student:_____

Date:_____ Teacher:_____

Observer:_____ Number of Students in Group:_____

Number of observations prior to rating:_____

Time observation begins:_____ Time observation ends:_____

Time allocated to reading instruction per day:_____

Curriculum used for instruction: Publisher_____

Series_____ Level_____

Instructions

Circle the number that accurately reflects your rating for each variable. Only one number may be circled per variable. If you are unable to evaluate a certain variable, mark N/A (not applicable) next to the left-hand column.

1. Instructional Grouping	1	2	3	4	5
2. Teacher-directed Learning	1	2	3	4	5
3. Active Academic Responding	1	2	3	4	5
4. Demonstration/Prompting	1	2	3	4	5
5. Controlled Practice	1	2	3	4	5
6. Frequency of Correct Answers	1	2	3	4	5
7. Independent Practice	1	2	3	4	5
8. Corrections	1	2	3	4	5
9. Positive Consequences	1	2	3	4	5
10. Pacing	1	2	3	4	5
11. Oral Practice on Outcome Behavior	1	2	3	4	5
12. Silent Practice on Outcome Behavior	1	2	3	4	5

SIRS

Operational Definitions Codebook

1. Instructional Grouping

5 - 90% or more of the instruction this student receives from the teacher is on an individual basis.

1 - 10% or less of the instruction this student receives from the teacher is on an individual basis.

2. Teacher-Directed Learning

5 - Student's instruction is extremely organized, businesslike, and teacher is firm in direction and control of activities. For example, student is presented with questions, student has material to cover, etc.

1 - Student's instruction is casually organized and very spontaneous. Teacher is not committed to having the student work on a particular set of material. Instructional materials do not determine what activities student engages in and the lessons change according to problems or mood of this student.

3. Active Academic Responding

5 - The student is actively practicing the academic skills to be learned more than 75% of the time observed. Specifically, the student is engaged in oral or written responding to teacher questions or written material, e.g., reading aloud, answering questions, writing, or computing. Student rarely is involved in non-academic conversations with teacher or other students Attending to the lesson without responding, such as sitting, looking, listening, and/or following along in a book does not apply. The student must make an active, written or oral response.

1 - The student is actively practicing the skills to be learned less than 10% of the time observed. Instructional lessons may be interrupted or shortened to include "process" and other non-academic activities, e.g., clarifying feelings, opinions, and working on arts and crafts.

4. Demonstration and Prompting

5 - Appropriate steps of the desired behavior to be performed are demonstrated for the student. Student is given an opportunity to practice the step(s) as teacher provides prompts for correct behavior that approximates or achives desired response.

1 - Teacher attempts to teach the student a behavior without using demonstration and prompting techniques.

SIRS

5. Controlled Practice

5 - Student's practice of material is actively controlled by teacher who frequently asks questions to clarify that the student understands what has just been demonstrated. Questions are convergent (single factual answer) and the student's answers consistently follow the questions and are given teacher feedback.

1 - Student is rarely questioned by teacher following demonstration of new materials. Questions are more divergent (open-ended, several interpretations) than convergent (single factual answer). Student's response is not consistently followed by teacher feedback. The type of questions are such that several answers are acceptable, i.e., questions are abstract or ambiguous.

Examples:

If during an oral reading session:

a) the teacher frequently attempts to clarify the material with convergent questions ("what color hat was John wearing?"), a 5 would be recorded.

b) the teacher asks few questions, most of which are divergent ("What do you think this means?"), a 1 would be recorded.

c) the teacher asks few convergent questions or many divergent questions, the appropriate rating would be a 3.

6. Frequency of Correct Answers

5 - Academic lessons are conducted in such a way that the difficulty of the material allows the student to achieve mean accuracy of 80% or higher.

1 - Academic material is difficult for student, component steps are large or unsequenced, and mean accuracy for student is less than 55%.

(Note: If the student has no opportunity for oral or written response during the observational period, item 6 would be rated N/A - not applicable, while items 3 and 5 would most likely be rated 1).

7. Independent Practice

5 - When engaged in independent seatwork, the student frequently is monitored by the teacher who assists, clarifies, and praises the student for academic engaged tasks.

(Note: Independent seatwork is defined here as a student working on an assigned task for at least 5 minutes. [If no such 5-minute block of time is observed, Item 7 is rated N/A].)

1 - When student is engaged in academic seat-work activities, little attention is given by teacher who directs seat-work activities from a distance or engages in work separate from the assigned seat work. Teacher is generally not helpful or supportive to student during independent practice time.

8. Corrections

5 - The student's errors are consistently corrected by the teacher. When the student either does not respond, responds incorrectly, or does not respond in unison if the activity is group directed and requires such responding, the teacher will systematically attempt to correct the student by asking a simpler question, refocusing student's attention to elicit correct response from the student or provide general rules by which to determine the correct answer 90% or more of the time.

1 - Student's errors are rarely and inconsistently corrected by the teacher. The student responses are not systematically corrected. Student's errors are corrected 50% or less of the time.

For example: In oral reading this includes teacher correction of skips and mispronunciations, or help in sounding out hesitations.

9. Positive Consequences

5 - Positive events (tokens, points, activities, etc.) are given to the student when performing the desired behavior. When learning a new skill the student receives positive consequence for approximations of the desired behavior. Consequences are consistently received during academic training time. Praise and compliments, e.g., "good working, nice job," are not included in this definition.

1 - Student rarely receives positive consequences for academic work. When student receives consequences they usually are for social behavior, rather than for behaviors occurring under systematic academic training.

10. Pacing

5 - The pace of the lesson is rapid, providing many opportunities for response by the student. As a result, attention is high and off-task behavior is low.

1 - The pace of the lesson is slow and the student's rate of responding is low. Lesson format frequently varies, is not highly structured, and student attention may be low.

11. Oral Practice on Outcome Behavior

5 - Student reads aloud from context nearly all the time (85-100% or 12-15 min. of a 15 min. observation).

1 - Student does not read aloud during the observation (0% of the time).

(Note: Reading aloud for measurement purposes should not be considered when rating this variable. Reading in context is defined as reading phrases, sentences, paragraphs, or story selections.)

Examples:

If the student is reading isolated words nearly the entire time, the appropriate rating is a 3.

If the student is reading aloud from a text about half the time, a 3 would be recorded.

12. Silent Practice on Outcome Behavior

5 - Student reads silently from context nearly all the time (85-100% or 12-15 min. of a 15 min. observation).

1 - Student does not read silently during the observation (0% of the time).

(Note: Reading in context is defined as the same as #11. The examples of #11 are the same for #12, with silent reading.)

PUBLICATIONS

Institute for Research on Learning Disabilities
University of Minnesota

The Institute is not funded for the distribution of its publications. Publications may be obtained for $4.00 each, a fee designed to cover printing and postage costs. Only checks and money orders payable to the University of Minnesota can be accepted. All orders must be prepaid. Requests should be directed to: Editor, IRLD, 350 Elliott Hall; 75 East River Road, University of Minnesota, Minneapolis, MN 55455.

The publications listed here are only those that have been prepared since 1982. For a complete, annotated list of all IRLD publications, write to the Editor.

Wesson, C., Mirkin, P., & Deno, S. Teachers' use of self instructional materials for learning procedures for developing and monitoring progress on IEP goals (Research Report No. 63). January, 1982.

Fuchs, L., Wesson, C., Tindal, G., Mirkin, P., & Deno, S. Instructional changes, student performance, and teacher preferences: The effects of specific measurement and evaluation procedures (Research Report No. 64). January, 1982.

Potter, M., & Mirkin, P. Instructional planning and implementation practices of elementary and secondary resource room teachers: Is there a difference? (Research Report No. 65). January, 1982.

Thurlow, M. L., & Ysseldyke, J. E. Teachers' beliefs about LD students (Research Report No. 66). January, 1982.

Graden, J., Thurlow, M. L., & Ysseldyke, J. E. Academic engaged time and its relationship to learning: A review of the literature (Monograph No. 17). January, 1982.

King, R., Wesson, C., & Deno, S. Direct and frequent measurement of student performance: Does it take too much time? (Research Report No. 67). February, 1982.

Greener, J. W., & Thurlow, M. L. Teacher opinions about professional education training programs (Research Report No. 68). March, 1982.

Algozzine, B., & Ysseldyke, J. Learning disabilities as a subset of school failure: The oversophistication of a concept (Research Report No. 69). March, 1982.

Fuchs, D., Zern, D. S., & Fuchs, L. S. A microanalysis of participant behavior in familiar and unfamiliar test conditions (Research Report No. 70). March, 1982.

Shinn, M. R., Ysseldyke, J., Deno, S., & Tindal, G. A comparison of psychometric and functional differences between students labeled learning disabled and low achieving (Research Report No. 71). March, 1982.

Thurlow, M. L. Graden, J., Greener, J. W., & Ysseldyke, J. E. Academic responding time for LD and non-LD students (Research Report No. 72). April, 1982.

Graden, J., Thurlow, M., & Ysseldyke, J. Instructional ecology and academic responding time for students at three levels of teacher-perceived behavioral competence (Research Report No. 73). April, 1982.

Algozzine, B., Ysseldyke, J., & Christenson, S. The influence of teachers' tolerances for specific kinds of behaviors on their ratings of a third grade student (Research Report No. 74). April, 1982.

Wesson, C., Deno, S., & Mirkin, P. Research on developing and monitoring progress on IEP goals: Current findings and implications for practice (Monograph No. 18). April, 1982.

Mirkin, P., Marston, D., & Deno, S. L. Direct and repeated measurement of academic skills: An alternative to traditional screening, referral, and identification of learning disabled students (Research Report No. 75). May, 1982.

Algozzine, B., Ysseldyke, J., Christenson, S., & Thurlow, M. Teachers' intervention choices for children exhibiting different behaviors in school (Research Report No. 76). June, 1982.

Tucker, J., Stevens, L. J., & Ysseldyke, J. E. Learning disabilities: The experts speak out (Research Report No. 77). June, 1982.

Thurlow, M. L., Ysseldyke, J. E., Graden, J., Greener, J. W., & Mecklenberg, C. Academic responding time for LD students receiving different levels of special education services (Research Report No. 78). June, 1982.

Graden, J. L., Thurlow, M. L., Ysseldyke, J. E., & Algozzine, B. Instructional ecology and academic responding time for students in different reading groups (Research Report No. 79). July, 1982.

Mirkin, P. K., & Potter, M. L. A survey of program planning and implementation practices of LD teachers (Research Report No. 80). July, 1982.

Fuchs, L. S., Fuchs, D., & Warren, L. M. Special education practice in evaluating student progress toward goals (Research Report No. 81). July, 1982.

Kuehnle, K., Deno, S. L., & Mirkin, P. K. Behavioral measurement of social adjustment: What behaviors? What setting? (Research Report No. 82). July, 1982.

Fuchs, D., Dailey, Ann Madsen, & Fuchs, L. S. Examiner familiarity and the relation between qualitative and quantitative indices of expressive language (Research Report No. 83). July, 1982.

Videen, J., Deno, S., & Marston, D. Correct word sequences: A valid indicator of proficiency in written expression (Research Report No. 84). July, 1982.

Potter, M. L. Application of a decision theory model to eligibility and classification decisions in special education (Research Report No. 85). July, 1982.

Greener, J. E., Thurlow, M. L., Graden, J. L., & Ysseldyke, J. E. The educational environment and students' responding times as a function of students' teacher-perceived academic competence (Research Report No. 86). August, 1982.

Deno, S., Marston, D., Mirkin, P., Lowry, L., Sindelar, P., & Jenkins, J. The use of standard tasks to measure achievement in reading, spelling, and written expression: A normative and developmental study (Research Report No. 87). August, 1982.

Skiba, R., Wesson, C., & Deno, S. L. The effects of training teachers in the use of formative evaluation in reading: An experimental-control comparison (Research Report No. 88). September, 1982.

Marston, D., Tindal, G., & Deno, S. L. Eligibility for learning disability services: A direct and repeated measurement approach (Research Report No. 89). September, 1982.

Thurlow, M. L., Ysseldyke, J. E., & Graden, J. L. LD students' active academic responding in regular and resource classrooms (Research Report No. 90). September, 1982.

Ysseldyke, J. E., Christenson, S., Pianta, R., Thurlow, M. L., & Algozzine, B. An analysis of current practice in referring students for psychoeducational evaluation: Implications for change (Research Report No. 91). October, 1982.

Ysseldyke, J. E., Algozzine, B., & Epps, S. A logical and empirical analysis of current practices in classifying students as handicapped (Research Report No. 92). October, 1982.

Tindal, G., Marston, D., Deno, S. L., & Germann, G. Curriculum differences in direct repeated measures of reading (Research Report No. 93). October, 1982.

Fuchs, L.S., Deno, S. L., & Marston, D. Use of aggregation to improve the reliability of simple direct measures of academic performance (Research Report No. 94). October, 1982.

Ysseldyke, J. E., Thurlow, M. L., Mecklenburg, C., & Graden, J. Observed changes in instruction and student responding as a function of referral and special education placement (Research Report No. 95). October, 1982.

Fuchs, L. S., Deno, S. L., & Mirkin, P. K. Effects of frequent curriculum-based measurement and evaluation on student achievement and knowledge of performance: An experimental study (Research Report No. 96). November, 1982.

Fuchs, L. S., Deno, S. L., & Mirkin, P. K. Direct and frequent measurement and evaluation: Effects on instruction and estimates of student progress (Research Report No. 97). November, 1982.

Tindal, G., Wesson, C., Germann, G., Deno, S. L., & Mirkin, P. K. The Pine County model for special education delivery: A data-based system (Monograph No. 19). November, 1982.

Epps, S., Ysseldyke, J. E., & Algozzine, B. An analysis of the conceptual framework underlying definitions of learning disabilities (Research Report No. 98). November, 1982.

Epps, S., Ysseldyke, J. E., & Algozzine, B. Public-policy implications of different definitions of learning disabilities (Research Report No. 99). November, 1982.

Ysseldyke, J. E., Thurlow, M. L., Graden, J. L., Wesson, C., Deno, S. L., & Algozzine, B. Generalizations from five years of research on assessment and decision making (Research Report No. 100). November, 1982.

Marston, D., & Deno, S. L. Measuring academic progress of students with learning difficulties: A comparison of the semi-logarithmic chart and equal interval graph paper (Research Report No. 101). November, 1982.

Beattie, S., Grise, P., & Algozzine, B. Effects of test modifications on minimum competency test performance of third grade learning disabled students (Research Report No. 102). December, 1982

Algozzine, B., Ysseldyke, J. E., & Christenson, S. An analysis of the incidence of special class placement: The masses are burgeoning (Research Report No. 103). December, 1982.

Marston, D., Tindal, G., & Deno, S. L. Predictive efficiency of direct, repeated measurement: An analysis of cost and accuracy in classification (Research Report No. 104). December, 1982.

Wesson, C., Deno, S., Mirkin, P., Sevcik, B., Skiba, R., King, R., Tindal, G., & Maruyama, G. Teaching structure and student achievement effects of curriculum-based measurement: A causal (structural) analysis (Research Report No. 105). December, 1982.

Mirkin, P. K., Fuchs, L. S., & Deno, S. L. (Eds.). Considerations for designing a continuous evaluation system: An integrative review (Monograph No. 20). December, 1982.

Marston, D., & Deno, S. L. Implementation of direct and repeated measurement in the school setting (Research Report No. 106). December, 1982.

Deno, S. L., King, R., Skiba, R., Sevcik, B., & Wesson, C. The structure of instruction rating scale (SIRS): Development and technical characteristics (Research Report No. 107). January, 1983.

Thurlow, M. L., Ysseldyke, J. E., & Casey, A. Criteria for identifying LD students: Definitional problems exemplified (Research Report No. 108). January, 1983.

Tindal, G., Marston, D., & Deno, S. L. The reliability of direct and repeated measurement (Research Report No. 109). February, 1983.

Fuchs, D., Fuchs, L. S., Dailey, A. M., & Power, M. H. Effects of pre-test contact with experienced and inexperienced examiners on handicapped children's performance (Research Report No. 110). February, 1983

King, R. P., Deno, S., Mirkin, P., & Wesson, C. The effects of training teachers in the use of formative evaluation in reading: An experimental-control comparison (Research Report No. 111). February, 1983.

Tindal, G., Deno, S. L., & Ysseldyke, J. E. Visual analysis of time series data: Factors of influence and level of reliability (Research Report No. 112). March, 1983.

Tindal, G, Shinn, M., Fuchs, L., Fuchs, D., Deno, S., & Germann, G. The technical adequacy of a basal reading series mastery test (Research Report No. 113). April, 1983.

Sevcik, B., Skiba, R., Tindal, G., King, R., Wesson, C., Mirkin, P., & Deno, S. Communication of IEP goals and student progress among parents, regular classroom teachers, and administrators using systematic formative evaluation (Research Report No. 114). April, 1983.

Wesson, C. Two student self-management techniques applied to data-based program modification (Research Report No. 115). April, 1983.

Wesson, C., Skiba, R., Sevcik, B., King, R., Tindal, G., Mirkin, P., & Deno, S. The impact of the structure of instruction and the use of technically adequate instructional data on reading improvement (Research Report No. 116). May, 1983.

Wesson, C. Teacher vs student selection of instructional activities (Research Report No. 117). May, 1983.

Tindal, G., & Deno, S. Factors influencing the agreement between visual and statistical analyses of time series data (Research Report No. 118). June, 1983.

Skiba, R. S. Classroom behavior management: A review of the literature (Monograph No. 21), June, 1983.

Graden, J. L., Thurlow, M. L., & Ysseldyke, J. E. When are students most academically engaged? Academic responding time in different instructional ecologies (Research Report No. 119). June, 1983.

Fuchs, L. S., Deno, S. L., & Roettger, A. The effect of alternative data-utilization rules on spelling achievement: An n of 1 study (Research Report No. 120). June, 1983.

Skiba, R., Sevcik, B., Wesson, C., King, R., & Deno, S. The non-effect of process-product variables in resource classrooms (Research Report No. 121). June, 1983.