

Research Series No. 57

TEACHING STYLES AT SOUTH BAY SCHOOL:
THE SOUTH BAY STUDY, PART I

Bruce Joyce and Kathleen McNair

Published By

The Institute for Research on Teaching
252 Erickson Hall
Michigan State University
East Lansing, Michigan 48824

July 1979

This work is sponsored in part by the Institute for Research on Teaching, College of Education, Michigan State University. The Institute for Research on Teaching is funded primarily by the Program for Teaching and Instruction of the National Institute of Education, United States Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position, policy, or endorsement of the National Institute of Education. (Contract No. 400-76-0073)

Institute for Research on Teaching

The **Institute for Research on Teaching** was founded at Michigan State University in 1976 by the National Institute of Education. Following a nationwide competition in 1981, the NIE awarded a second contract to the IRT, extending work through 1984. Funding is also received from other agencies and foundations for individual research projects.

The IRT conducts major research projects aimed at improving classroom teaching, including studies of classroom management strategies, student socialization, the diagnosis and remediation of reading difficulties, and teacher education. IRT researchers are also examining the teaching of specific school subjects such as reading, writing, general mathematics, and science, and are seeking to understand how factors outside the classroom affect teacher decision making.

Researchers from such diverse disciplines as educational psychology, anthropology, sociology, and philosophy cooperate in conducting IRT research. They join forces with public school teachers, who work at the IRT as half-time collaborators in research, helping to design and plan studies, collect data, analyze and interpret results, and disseminate findings.

The IRT publishes research reports, occasional papers, conference proceedings, a newsletter for practitioners, and lists and catalogs of IRT publications. For more information, to receive a list or catalog, and/or to be placed on the IRT mailing list to receive the newsletter, please write to the IRT Editor, Institute for Research on Teaching, 252 Erickson Hall, Michigan State University, East Lansing, Michigan 48824-1034.

Co-Directors: Jere E. Brophy and Andrew C. Porter

Associate Directors: Judith E. Lanier and Richard S. Prawat

Editorial Staff

Editor: Janet Eaton

Assistant Editor: Patricia Nischan

Research Series No. 57

TEACHING STYLES AT SOUTH BAY SCHOOL:
THE SOUTH BAY STUDY, PART I

Bruce Joyce and Kathleen McNair

Published By

The Institute for Research on Teaching
252 Erickson Hall
Michigan State University
East Lansing, Michigan 48824

Printed and Distributed
by the
College of Education
Michigan State University

July 1979

This work is sponsored in part by the Institute for Research on Teaching, College of Education, Michigan State University. The Institute for Research on Teaching is funded primarily by the Program for Teaching and Instruction of the National Institute of Education, United States Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position, policy, or endorsement of the National Institute of Education. (Contract No. 400-76-0073)

Institute for Research on Teaching

The **Institute for Research on Teaching** was founded at Michigan State University in 1976 by the National Institute of Education. Following a nationwide competition in 1981, the NIE awarded a second contract to the IRT, extending work through 1984. Funding is also received from other agencies and foundations for individual research projects.

The IRT conducts major research projects aimed at improving classroom teaching, including studies of classroom management strategies, student socialization, the diagnosis and remediation of reading difficulties, and teacher education. IRT researchers are also examining the teaching of specific school subjects such as reading, writing, general mathematics, and science, and are seeking to understand how factors outside the classroom affect teacher decision making.

Researchers from such diverse disciplines as educational psychology, anthropology, sociology, and philosophy cooperate in conducting IRT research. They join forces with public school teachers, who work at the IRT as half-time collaborators in research, helping to design and plan studies, collect data, analyze and interpret results, and disseminate findings.

The IRT publishes research reports, occasional papers, conference proceedings, a newsletter for practitioners, and lists and catalogs of IRT publications. For more information, to receive a list or catalog, and/or to be placed on the IRT mailing list to receive the newsletter, please write to the IRT Editor, Institute for Research on Teaching, 252 Erickson Hall, Michigan State University, East Lansing, Michigan 48824-1034.

Co-Directors: Jere E. Brophy and Andrew C. Porter

Associate Directors: Judith E. Lanier and Richard S. Prawat

Editorial Staff

Editor: Janet Eaton

Assistant Editor: Patricia Nischan

Abstract

This investigation into commonalities and varieties of teaching styles is part of a larger inquiry aimed at generating paradigms for the study of how teachers think and make decisions as they teach. The data were obtained from case studies of 10 elementary school teachers working in grades 1-5 at South Bay School in the San Francisco Bay Area. Each teacher was observed 12 times during the year using the Teacher Innovator System (TIS) designed to permit a description of the styles and strategies employed by teachers in classrooms. In nearly all observations, the teachers used a materials-based recitation pattern of teaching characterized by high task-orientation, directive procedures, and a focus on factual information. There were variations in stylistic differences in ways of managing the recitation (use of corrective feedback, attention to concepts, or negotiation within established goals). The recitation approach was stable across teachers and time. Approaches to high and low ability groups were similar. However, styles for handling procedures were more variable in subject areas other than reading. Also, ratios of attention to feedback, structuring, and information-processing fluctuated considerably across time, but remained within the recitation pattern.

Teaching Styles at South Bay School: The South Bay Study, Part I

Bruce Joyce and Kathleen McNair¹

Teachers make decisions that pertain to both immediate situations and the distant future. The sorts of decisions of interest in this study are relatively short-term. They include preactive decisions (those which take place shortly before instruction begins), and interactive decisions (those which occur during the instructional process). This distinction was introduced by Philip W. Jackson in his 1974 paper, "The Way Teaching Is."

As Morine (Note 1) points out, although many of the components of preactive thinking have been identified, researchers have paid little attention to the process of instructional planning or to the actual teacher concerns that affect it. What teachers actually do when planning and what effects those plans have on classroom interaction remain to be investigated. According to Zahorik (Note 2), preactive planning has typically been dealt with on the prescriptive level, with the focus on idealized models and recommendations rather than how teachers, in practice, typically prepare for lessons. Though much research on preactive planning has depended on the use of behavioral objectives, several investigations (Joyce & Harootunian, 1964; Popham & Baker, 1970) indicated that very few teachers use behavioral analysis as they prepare their lessons. It would be useful, then, to uncover what teachers really do think about when

¹Bruce Joyce is the director of Booksend Laboratories in Palo Alto, California. Kathleen McNair works with the California State Department of Education in Sacramento, California.

they prepare for class and why.

Research literature that pertains to teachers' interactive decision making is also sparse. Our scientific knowledge about the kinds of information or cues that teachers use when making "inflight" decisions is almost non-existent. The recent investigations by Clark, Peterson, Marx, Joyce, and Morine-Dershimer have generated the antecedents of the methodology used in the present study (see "An Introduction to the South Bay Study," which is included in this publication).

Though teacher behavior has been subjected to analyses by numerous category systems, no major category system exists for classifying the kinds of teacher thinking we believe occur regularly in teaching. To build such a system, more knowledge is needed about the thought processes and the types of information teachers seek and use as they teach. Only after that step is taken can studies be done of the similarities and differences among teachers with respect to their information-processing behavior and the outcomes, if any, which are associated with those differences.

We employed direct observation to determine teaching styles. Observers documented aspects of the transactions between 10 elementary teachers and their students over the 1976-1977 academic year. The results are discussed in five sections: the general nature of teaching styles, individual differences in style among the teachers, the stability of these measures of style over time, the effect of subject matter on style, and the effect of student ability level on style.

Method

Subjects

As described in the Introduction, the 10 participating teachers taught grades one through five at the South Bay School in the San

Francisco Bay Area. Only one of the teachers is male. Nine of the teachers are white; one is black. All have taught at least three years.

The school is the site of an extensive Teacher Corps project operated cooperatively by a local state university, the school district, and the Far West Laboratory for Educational Research and Development located in San Francisco. Two of the study's principal investigators, Greta Morine-Dershimer and Bruce Joyce, were on the staff of the Teacher Corps Project at the time of the study.

South Bay School uses a staggered reading program in which the class is divided into two groups on the basis of reading achievement. The lower achievers attend school from 8:30 a.m. until 1:45 p.m., while the higher achievers attend school from 9:30 a.m. until 2:30 p.m. Thus, for the first and last hours of the day, only half of the class is present. Reading instruction takes place at these times. This practice provided us with an opportunity to compare teachers' styles during instruction in reading for high- and low-achieving children.

Procedures

Four observers² were trained to use the Teacher Innovator System (TIS). This system is a device for categorizing the communication of teachers and students and was designed to be sensitive to variations in teaching styles within different models of teaching (Joyce, 1977). The first version of the system was used in 1963 (Joyce & Harootunian, 1966) and it has been modified a number of times since then to ensure that it will effectively reflect variations in teaching strategies and styles (McKibbin, 1974).

²The observers were Brenda Fikes, Elizabeth Edwards, Beverly Showers, and Kathleen McNair.

We will assume that the reader is familiar with the three major dimensions of the system -- structuring, information-processing, and feedback -- and also the meanings of the 19 subcategories into which the communications of teachers and students are placed. (Descriptions of the categories and subcategories are included in the Appendix.) Essentially, the observer categorizes communication units (an utterance on one topic to one audience not to exceed 15 seconds) by identifying the source (teacher or student), the type of move (question or statement), and the category into which the communication falls.

The four observers were trained in a series of six sessions which introduced them to the categories, and in which they practiced coding using videotapes of teaching episodes. The tapes they practiced with included a diversity of teaching styles and strategies to ensure that they would be sensitive to a range of teacher behaviors. The observers achieved 95% agreement. After training, they used an "overlapping" coding schedule to provide a continuous check of reliability.

The 10 teachers were observed 12 times each for a total of 120 observations.

Results

Data from TIS Categories

General teaching styles. The TIS categories are presented in Table 1, ranked by the frequency of their occurrence over all observations. Altogether, more than 22,200 communications were recorded (approximately 180 per teacher per observation).

Level 1 information-processing communications accounted for 58% of all the communications recorded. Level 1 questions and statements elicit or provide factual information. Questions of this type do not

require the learner to develop concepts, state them, make inferences, or hypothesize.

A high concentration of Level 1 information-processing moves characterizes the *recitation style* of teaching in which the teacher asks lower-order questions and questions to elicit knowledge of facts and the student responds in kind (Hoetker & Ahlbrand, 1969). The dominance of these moves is evidence that the recitation method was probably the dominant mode at South Bay School.

Level 2 information-processing represented about one in 30 of all information-processing communications. Level 2 communications state a concept or elicit a statement of a concept from a student. They are characteristic of inductive and conceptual teaching models. Studies of teachers carrying out concept-oriented and inductive models of teaching have documented that about 200 out of the typical 500 communications which occur during a single hour of teaching are of the Level 2 type (Joyce, Weil, & Wald, 1973). That is low enough to warrant the conclusion that concept-oriented approaches were not being used.

Level 3 information-processing communications averaged not quite one for every 1000 communications. Level 3 communications state or elicit hypotheses, theories, or causal explanations. The general absence of such communications indicated that complex information-processing models of teaching were not being used during the periods of observation.

Communications categorized as *open* information processing and those that were solicitations or statements of *opinion* had a combined frequency of less than five per 1,000 communications. These two categories, together with Level 3 information processing, are characteristic of classrooms in which there is open discussion of issues and in which concept-building activities are dominant. Their absence indicated that

Table 1: Categories Ranked by Frequency of Occurrence Over All Observations

Rank	Category Name	Number	Percent of total
1	Level 1 information-processing (factual)	(9)	58
2	Instructional implementation	(7)	12
3	Procedures, directive	(5)	10
4	Positive feedback	(14)	6
5	Corrective feedback	(17)	3
6	Level 2 information-processing (conceptual)	(10)	3
7	Repeating	(18)	3
8	Neutral feedback	(15)	1
9	Non-instructional implementation	(8)	1
10	Content, directive	(3)	1
11	Digression	(19)	1
12	Open information-processing	(12)	0.4
13	Negative feedback	(16)	0.2
14	Goals and standards, directive	(1)	0.1
15.5	Content, negotiated	(4)	0.08
15.5	Level 3 information-processing	(11)	0.08
17	Procedures, negotiated	(6)	0.04
18	Opinion information-processing	(13)	0.03
19	Goals and standards, negotiated	(2)	0

no personal or social models of teaching were being employed (Joyce, & Weil, 1972).

It thus appeared that the information-processing communications in these classrooms were directed toward the mastery of specific facts rather than the development of concepts, speculation about issues, or the expression and exploration of attitudes and feelings. The lack of opinion-oriented information-processing communications also indicated that the classroom content was affectively neutral and that expressions of personal opinion were seldom given or sought during the observation period.

Instructional implementation was the second most frequently used category with about 12% of the total number of communications. Implementation communications are those which arrange the events and participants during a classroom activity. Calling on students, indicating specific details of activities to be done next, and giving short instructional commands are examples of instructional implementation communications.

The third most common category was *directive procedures*. This category contains communications in which the teacher or student determines procedures by identifying the content to be explored and the means by which it is to be dealt with. Directive procedures, when not balanced by indirect procedures, are characteristic of highly structured classrooms. Communications categorized as *negotiated content* ranked 15th, *negotiated procedures* ranked 17th, and *negotiated goals and standards* ranked last. Clearly, these classrooms were highly structured with relatively little negotiation of goals, standards, procedures, or content occurring.

Together, directive procedures and instructional implementation accounted for almost 25% of all communications. Combined, Level 1 information processing, directive procedures, and implementation

communications accounted for 80% of all of the moves which occurred in the transactions during the period of observation. What emerged was an overall picture of directive and straightforward teaching aimed at the mastery of facts. *Students asked only 20% of all questions posed during the period of observation.*

Positive and corrective feedback were the fourth and fifth ranked categories, respectively. Positive feedback is a reinforcement of a behavior, and corrective feedback is a communication which accepts the student's statement, but provides information about how it could be improved.

The occurrence of such a high proportion of corrective feedback also indicated a task-oriented classroom in which mastery is highly valued.

The occurrence of either neutral feedback, at 1% of the total observations, or negative feedback, at .3% of the total observations, is rare and indicates an atmosphere which is positive, if task oriented.

Biannual comparison. The observations before January (the mid-year point) were compared with those after January. The major difference appears to be an increase in the use of higher level conceptual communications (categories 10 and 11) in the second half of the year. However, the increases were from 2% to 4% and .01% to .2%, respectively, neither of which indicate a major style change, especially since the high percent of Level 1 information-processing communications remained the same.

Note also that the majority of the higher level communications in the post-January period came from single observations of two teachers and thus do not reflect a group-wide shift. Fifteen of the 16 Level 3 communications occurring after January occurred during one observation

of Teacher 110. There was a very slight increase in the amount of open information-processing communications, from .2% to 1% in the second half of the year, which may indicate a slightly more informal approach between teacher and students as the year progressed.

There was a decrease in communications pertaining to negotiated content, but since all of these communications came from one teacher during one lesson, we cannot infer a change over time for all teachers.

There was a decrease in corrective feedback and a slight increase in repetition, which could indicate an increase in the students' storehouse of correct factual information.

Differences among teachers. The uneven distribution of communications among the categories leads us to believe that the South Bay School teachers had styles that were more similar than different. In the following section, communications are broken down by teacher over the categories and the teachers are compared to each other more closely.

Level 1 information processing was the category of greatest use for all teachers. Implementation communications, directive procedures, and positive feedback were also highly prominent in all cases.

Teachers 102, 106, and 110³ generated relatively more Level 2 information-processing communications than did the other teachers. Teacher 106 provided about 90% of the Level 3 information-processing communications, though they only comprised about .8% of the total communications recorded in her room. Teacher 107 contributed practically all of the communications concerned with opinions, though they comprised only .29% of the total communications recorded in her classroom.

Teacher 102 was characterized by the use of considerable corrective feedback. Teacher 104 exhibited comparatively little positive

³See page xv of the *Introduction*, where subjects' assigned numbers are matched with descriptions and characteristics of individual participating teachers.

feedback, while Teachers 101, 109, and 110 used it most.

Teachers 103 and 104 generated a relatively high frequency of procedural communications except at the implementation level. Teacher 103 generated 17 of the 26 observed negotiated communications, while Teacher 107 provided 10 of the 24 directive goal statements.

These data indicate that although all of these teachers relied on the recitation method, within that method each one made small variations to suit his or her style. These variations were not wide enough, however, to contradict the contention that each teacher worked fairly closely within a didactic interaction pattern, in which "lessons to be learned" were paramount.

To further compare teachers' styles, correlations were computed on the basis of each teacher's use of a particular communication type over all observations. Each Teacher Innovator System category was ranked in terms of its use by each teacher. Then, rank order correlations of the categories by teacher were computed. Not only were all of the coefficients significant despite the small number of teachers, but the median coefficient was .90. The dominance of the recitation style of teaching as depicted in the Teacher Innovator System categories was once again indicated by the high correlations among teachers. But, again within that framework, certain teachers were more or less alike than others.

Teacher 105 had an above-average correlation with every other teacher but Teacher 109. Teacher 101 had an above-average correlation with six of the remaining nine teachers. Teacher 110 also had an above-average correlation with six (but a different six) of the remaining nine teachers. These teachers all taught within the same system but displayed

variations in style of feedback, negotiation, and attention to concepts.

Data from TIS Indices: Indicators of Style Variations

The Indices

Not all TIS categories were descriptive of this group of teachers, since they typically used just one teaching model. To examine variations within this basic approach across time and among teachers, we sought global measures and used ratios between sets of categories. Those ratios were referred to as indices.

Nine indices were developed for use in the basic analyses:

1. All feedback communications regardless of source, (Categories 14, 15, 16, & 17) divided by the total number of all communications recorded (SUMR1).
2. The total number of information-processing communications, regardless of source, (Categories 9, 10, 11, 12, & 13) divided by the total number of communications recorded (SUMR2).
3. The total number of structuring communications (Categories 1, 2, 3, 4, 5, 6, 7, & 8) divided by the total number of communications (SUMR3).
4. The total number of positive sanctions (Category 14) divided by the total number of negative sanctions (Category 16) recorded (SUMR4).
5. The total number of higher order communications (Categories 10 & 11) divided by the total number of lower order communications in the information-processing category (Category 9)(SUMR5).
6. The total number of negotiated structuring communications (Categories 2, 4, & 6) divided by the total number of directive structuring communications (Categories 1, 3, & 5) (SUMR6).
7. The total amount of student talk divided by the total amount of teacher talk (S01).
8. All teacher questions divided by all teacher statements (S02).
9. The total number of student questions divided by the total number of student statements (S03).

Indices 4, 5, and 6 were not productive due to the low frequency of negative sanctions, higher-order communications, and the low incidence of negotiated structuring. Because of this, they have been left out in the following analyses.

Indices Among Teachers

To determine if teachers differed significantly among themselves on any index, a one-way analysis of variance was performed for each index using the teacher as the independent variable. F-ratios and F_{\max} values based on Hartley's test for homogeneity of variance in which the highest variance computed among the teachers is divided by the smallest variance) were computed.

Significant differences appear in two indices, SUMR1 and S01. To establish which teachers differed significantly, the Newman-Keuls multiple range test was employed at the .05 level.

Teachers 102, 109, and 110 provided significantly more feedback than Teachers 103, 104, 107, and 108. In Teacher 102's classroom, students contributed significantly more communications than they did in the classrooms of Teachers 104, 105, and 108.

Before beginning the data collection, we thought that the two special education teachers would differ from the rest of the teachers with respect to the Teacher Innovator System indices. Thus contrasts comparing the means of the special education teachers to all of the other teachers, and to each other's, were performed for each index.

The two special education teachers did not differ significantly from each other on any of the indices. Together, however, they differed from the other teachers on all of the indices but two -- Numbers 2 and 7. The

special education classes in South Bay School looked like the other classes in terms of quantity of information-processing communications and ratio of student talk to teacher talk. They were different from the other classrooms in terms of more feedback, less structuring, more teacher questions, and fewer student questions.

As the year progressed, it seemed likely that the three first-grade teachers operated somewhat differently from each other within the recitation mode. Thus three post hoc contrasts were performed comparing each first-grade teacher to the other. No significant differences occurred between Teachers 101 and 102 for any index, nor did any significant difference occur between Teachers 101 and 103. Significant differences occurred, however, between Teachers 102 and 103 on feedback communications, structuring communications, and student talk divided by teacher talk. More feedback occurred in Teacher 102's classroom than in Teacher 103's, while more structuring occurred in Teacher 103's classroom than in Teacher 102's. Finally, more student talk occurred in Teacher 102's classroom than in Teacher 103's.

Post hoc contrasts were also performed on each index for the two third-grade teachers and the two fifth-grade teachers, but no significant differences were found on any index for either pair of teachers.

Indices Across Lessons

To determine if any significant differences occurred between lessons, a one-way analysis of variance was performed for each index using the lesson as the independent variable. We computed F-ratios and F_{\max} values. A significant F-ratio appeared for only one index, S02.

Again using the Newman-Keuls procedure, homogeneous subsets were generated. Significantly more teacher questions occurred per teacher

statements in Lesson 1 than in Lessons 2, 3, 5, 8, and 11. Lesson 1 was a reading lesson for less advanced students. The group of lessons with significantly lower means contains both reading and non-reading lessons as well as lessons with slower and with faster students. Thus it is not apparent why Lesson 1 differs from the others.

The variation among teachers for any given observation is rather large and inconsistent from lesson to lesson. To further investigate differences between lessons, we computed coefficients of correlation for each of the six indices across the 12 observation periods.

The ratio of student talk to teacher talk across lessons. The pattern of correlation for this ratio across time was mixed indeed. The coefficients ranged from a low of $-.47$ to a high of $.75$. The ratio of student talk to teacher talk was relatively unstable on the whole. However, the coefficients between the lessons where the teachers were working with the high reading groups were relatively high ($.18$, $.49$, and $.70$), indicating that teacher behavior for working with the high reading groups was relatively stable.

When the teachers were working with the low reading groups, the coefficients between conditions were $-.47$, 0.0 , and $.48$. This indicated relatively low stability across that condition. The coefficients between conditions when the teachers were working in subject matter other than reading was $.54$, indicating relative stability under that condition.

Teacher questions divided by teacher lessons across time. Again, the coefficients between the conditions where the teachers were working with

the high reading group were .18, .73, and .82. However, the coefficients between conditions when the teachers were working with the low reading group were -.50, -.01, and .13.

Overall, the picture was similar to that of S01 across lessons, with the ratio of teacher questions to statements being relatively stable when the teachers were working with the high reading ability group, but much lower between the other conditions. The range of coefficients was considerable (from -.65 to .99).

Student questions divided by student answers across lessons. This ratio was derived from a relatively low frequency of student questions and we did not expect it to be stable. That was, in fact, the case. There was a rather large range of coefficients (-.47 to .91). The coefficients between conditions when the teacher was working in subject matter other than reading were .33, .46, and .91 indicating that the ratio of student questions to statements was relatively stable across that condition. However, the ratio for the conditions under which the teacher was working with the high reading group were of a mixed pattern, as were those when the teacher was working with the low reading group. All of the other patterns, considering conditions, were mixed.

Feedback communications across lessons. The coefficients for the feedback ratio were generally positive. Of the 70 coefficients, only 12 were negative and 22 were over .50.

The coefficients from Trial 8 onward were uniformly positive, indicating a relative stability for that index in the latter trials. The coefficients between Trials 1, 7, and 9 (when the teachers were working with the low-ability group) were only .25, .13, and .16, and for Trials 2, 8, and 12 (when teachers were working with the high-ability group) were .02, .41,

and .39 respectively.

Information-processing communications across lessons. The coefficients here varied quite a bit (from $-.98$ to $.84$). A large number of them were low; many were negative. Information processing as an emphasis varied quite a bit across time.

However, for Trials 1, 7, and 9, when the teachers were working with the "low achievers" in reading, coefficients were obtained of $.15$, $.42$, and $.40$ respectively, and, for the high reading group, of $.44$, $.30$, and $.57$. For other subject matter (Trials 4, 6, and 11), the coefficients obtained were $.43$, $-.55$, and $.10$, respectively. Information processing varied quite a bit. The greatest stability occurred when the teachers were working with groups of the same ability level.

Structuring communications across lessons. Here again, the pattern is quite mixed, with a wide range of coefficients ($-.84$ to $.88$). No consistent pattern emerged except when the teachers were working with high-ability groups where the correlations were $.12$, $.54$, and $.63$.

Reading Compared to Other Subjects

To determine if styles changed when teachers were teaching a subject other than reading, we scheduled observations of both a reading lesson and a non-reading lesson on the same day, three times throughout the year, for each teacher.

We compared teachers when they were teaching reading to when they were teaching another subject with respect to all feedback communications, regardless of source. The pattern was mixed; in some cases there was more feedback when the teachers were working in reading than in the other areas, in some cases there was less.

Information-processing communications were looked at when the teachers were teaching reading and other subjects. In almost all cases, the ratio dropped when the teachers were teaching subjects other than reading, indicating that there was less information processing and greater attention to structuring or feedback when the teachers were working in areas other than reading.

Structuring communications were examined on the same basis; the attention paid to procedures or structuring rose as the teachers worked in areas other than reading.

High- and Low-Ability Groups Compared

Because of South Bay School's staggered reading program, it was possible to observe six teachers when they were working separately with students they designated as "high" and "low" in reading ability.

Basically, the recitation pattern was not altered greatly for either ability group, but some teachers varied their patterns slightly when working with a different group. There were no consistent patterns of differences, however, across all teachers.

In three classes, feedback moves were greater in frequency with the low-ability group, and in three other classes they were less. The proportion of information-processing moves was similar for both groups in five classrooms, although in the case of Teacher 108, there was about 20% less information processing with the low-ability group than with the high-ability group. Structuring moves were slightly more prominent with the low ability group in five of the six cases, though in three cases it was very close. In Teacher 107's case, however, structuring occurred two-thirds again as often with the higher-ability group as with the lower-ability group.

The amount of student talk as opposed to teacher talk remained stable from the "low" to the "high" group for only two teachers (101 and 106). Three of the remaining four teachers indicated more student talk when working with the low-ability group, while Teacher 102 produced more student talk working with the high-ability group.

The pattern with respect to teacher questions versus teacher statements varied considerably with four teachers reporting more questions with the low-ability group and two reporting more questions with the high-ability group. With respect to student questions versus statements, the teachers were evenly divided but widely spread. In Teacher 104's room, students in the low-ability group asked over 12 times as many questions per statement as did the high-ability group, while in Teacher 106's room students in the high-ability group asked 32 times as many questions per statement as did the low-ability group.

Correlations Among the Indices

Correlations were computed among the SUMR and SO ratios. Information processing and the handling of procedures and feedback were inversely correlated. Sanctions were positively correlated with the use of positive sanctions. The greater amount of student talk, and the greater the amount of feedback and information processing, the lesser the amount of procedures employed. In other words, the more the teachers used structuring moves, the less the students talked. Similarly, the greater the amount of structuring, the less the teachers asked questions. The more directive teachers controlled procedures more and asked fewer questions of their students. Student questions over student statements is a relatively unstable index. However, its correlations with feedback and structuring communications are interesting. Lower use of feedback and less information processing resulted in greater amounts of student questions; greater

amounts of structuring also resulted in greater amounts of student questions. Similarly, the more students talked, the less they seemed to ask questions, and the more teachers asked questions, the less students appeared to talk.

The overall impression is one of a pattern in which the greater the amounts of teacher dominance of various types, the less the students are able to ask questions and process data for themselves.

Discussion

All 10 teachers used a fact-oriented, materials-based recitation strategy. This was determined by the uniformly high concentration of Level 1 information-processing communications and by the high proportion of positive and corrective feedback. The low percentage of Level 2 communications indicated that concept-oriented approaches were not employed, and the general absence of Level 3 communications, open information-processing, and opinion moves shows that no personal or social models of teaching were being used. The high occurrence of instructional implementation moves and directive procedures, as opposed to the low occurrence of negotiated goals, standards, procedures, and content, indicates that the classrooms were highly structured. A positive atmosphere was shown by the rare occurrence of neutral and negative feedback. The overall picture was one of very directive teaching aimed at the mastery of facts.

There was no change in the basic teaching style over the period of the 12 observations. Although there was some increase in Level 2 and Level 3 information-processing moves in the second half of the year, it was not enough to indicate a shift in style (particularly since the increase came from only two observations of two teachers). The slight increase in open information-processing communications may indicate a slightly more

informal approach as the year progressed. The decrease in corrective feedback and increase in repetition could mean an increase in the students' storehouse of correct factual information.

The teachers were more alike than different in regard to style. This is shown by the uneven distribution of communications among the categories. There were some variations in type of feedback, amount of negotiation, and attention to concepts, but the differences were small. One teacher used considerable corrective feedback, and another used comparatively less positive feedback. One teacher generated a large portion of the negotiated communications recorded, however they were still a very small percent of that teacher's total communications. Three of the teachers generated relatively more of the higher level information-processing moves, but again they were a very small portion of their communications. As expected, there was a noticeable variation in the special education classes, in which more feedback, less structuring, more teacher questions, and fewer student questions took place.

When the variations of teachers' styles were examined across time, the results were unstable, and no cross-time trends were evident.

When we examined style by the subject of the lesson, we found that there was less information processing and greater attention to structuring when subjects other than reading were being taught.

A comparison of high- and low-ability groups indicated that some teachers varied their styles when working with the different groups. However, there were no consistent patterns of differences across all teachers. Some teachers generated more feedback with the low-ability group and others generated more with the high-ability group. The proportion of information-processing moves was similar for both groups, and in most cases there were slightly more structuring moves with the low-ability group.

Reference Notes

1. Morine, Greta. A study of teacher planning. BTES Special Report C. Far West Laboratory, California, 1976.
2. Zahorik, J.A. Teachers' planning models. Paper presented to the American Educational Research Association, Washington, D.C., 1975.

References

- Hoetker, J., & Ahlbrand, W. The persistence of the recitation. American Educational Research Journal, 1969, VI, 145-167.
- Jackson, P.W. The way teaching is. Journal of Teacher Education, 1974, 1974, 15(1), 1-33.
- Joyce, B.R. The teacher innovator system: Molar and molecular codes for analyzing teaching styles and models. Columbia University, New York, NY: Teachers College Press, 1977.
- Joyce, B.R., & Harootunian, B. Teaching as problem solving. Journal of Teacher Education, 1964, 15(4).
- Joyce, B.R., & Harootunian, B. The structure of teaching. Chicago: Science Research Associates, 1966.
- Joyce, B.R., & Weil, M. Models of teaching. Englewood Cliffs, N.J.: Prentice Hall, 1972.
- Joyce, B.R., Weil, M., & Wald, R. Models of teaching as a paradigm for teacher education. Interchange, 1973, 4, 47-60.
- McKibbin, M. Psychological states and staff development. Theory into Practice, in press.
- Popham, J.W., & Baker, E. Establishing instructional goals. Englewood Cliffs, N.J.: Prentice Hall, 1970.

Appendix

The Teacher Innovator System

The Teacher Innovator System (TIS) is designed to describe the behavior of teachers and learners in the classroom. It is a system for classifying verbal behaviors according to a set of categories. It indicates the balance between teacher and pupil communications, the kinds of linguistic moves that are made in terms of questions and statements by each of the participants, and the pedagogical substance of the moves in terms of three major categories, nineteen subcategories, and a variety of stylistic categories. These categories have been constructed after the analysis of teaching episodes in more than 2,000 classrooms. The system has been made sensitive to wide variations of teaching styles and strategies.

The major TIS categories are *structuring*, *information-processing*, and *feedback*.

Structuring moves are those which define procedures or negotiate them. Either the teacher directs, invites the students to direct, or negotiates with the students the activities which are to take place.

In the *information-processing* dimension, the teacher and students create and handle data, they make statements to one another and question one another. The major substance of teaching episodes occurs through *information-handling*.

Feedback is the response generated between the teacher and student by confirming answers, objecting to others, providing corrections, etc.

There are eight sub-categories for structuring. The first six of these belong loosely to what we can call *planning* and the second two to

implementation. The planning categories alternate between *directive* and *negotiated*. Directive communications are those which tell someone what to do, and negotiated ones ask what someone would like to do or respond to a request for negotiation.

Goals and Standards (Categories 1 and 2):

These moves decide the expected outcomes of a classroom activity, such as the product, the behavioral objective, the standard of achievement or proficiency, and the criteria which will be used to evaluate outcomes. They may be either directive (1) or negotiated (2).

Content (Categories 3 and 4):

These moves set the context of the lesson within the ongoing work of the class, in terms of prior and future instructional activities, and determine the substantive focus of the activity being structured. They may be either directive (3) or negotiated (4).

Procedures (Categories 5 and 6):

These moves set the details of "who" and "how." For example, dividing a class into teams for a spelling bee, giving directions for a worksheet exercise, and describing the procedure in a concept attainment game are all procedural planning moves. Included in this category are the negotiations, which may go on at some length, when students are given the opportunity to decide how they want to go about studying a given content area. They may be either directive (5) or negotiated (6).

Instructional Implementation (Category 7):

These moves control the use of instructional materials ("Open

your books.") or the behavior of students for purely instructional purposes ("Now, look at this chart."). It does not include those instructional directives which call for cognitive activity, such as the use of manipulatives in math, the drawing of a graph, the writing of a poem, or the classifying of data nonverbally through the use of symbols drawn on the blackboard (stars, triangles, etc.). These are coded as *information-processing* at the appropriate levels.

Non-Instructional Implementation (Category 8):

These moves maintain the social environment of the classroom by enforcing the norms or rules for group and individual behavior ("Sit down and be quiet, please." "Get in line."), and to maintain the classroom as a physical environment. ("Would you clean the blackboards, Peggy?" "Open the window.")

There are five subcategories for information-processing. The first three of these relate to the cognitive levels at which information is being handled, while the last two are not specific in terms of cognitive level.

Level 1 Information Processing or Factual Level (Category 9):

The cognitive processes at this level are recalling, identifying, enumerating, describing, and translating information from one medium or mode to another (e.g., written to spoken, or iconic to symbolic). The assumption is that data are not manipulated, interrelated or transformed in any way at this level, but are given or used as given.

Level 2 Information Processing or Conceptual Level (Category 10):

Cognitive processes at this level are those which interrelate pieces of data in order to compare and/or contrast, to draw cause-

effect inferences, to interpret data, to apply what is given of general knowledge to a problem-solving situation, and to form concepts.

Level 3 Information Processing or Theoretical Level (Category 11):

This is the level at which concepts and facts are generalized and synthesized into a larger theoretical structure and at which problems are creatively or synthetically solved. Other cognitive activities at this level include hypothesizing, developing criteria, making judgments of value, and creating. In all of this, it is assumed that the thinker has taken given or remembered data and manipulated and transformed them to the point at which theoretical structures become the focus, rather than the actual facts.

Open Information Processing (Category 12):

This category is used to code questions or statements whose source or intent in terms of cognitive processes cannot be determined. Included in this category are those questions which are phrased so generally that they do not define adequately what kind of information the teacher is seeking ("Can you tell me anything about"), and those statements which are muddled, incomplete, or so oblique that cognitive level cannot be determined.

Opinion Information Processing (Category 13):

Statements or questions which express personal opinions or personal prejudices (i.e., judgments whose source and justification are personal or subjective rather than objective, empirically derived, or related to the substantive focus of a lesson) are coded as opinion. Should a lesson focus on experience-based content, the interaction is coded as information-processing at the appropriate levels, and not as opinion.

Statements which evaluate cognitive or non-cognitive behavior positively or negatively are coded as feedback. Their function as reaction is more important than as subjectively-based information. Feedback moves are divided into the following six subcategories:

Positive (Category 14):

These are moves which indicate that a verbal or non-verbal behavior is acceptable, appropriate, or correct; they may also indicate the degree of correctness. Such feedback ranges from "yes" or "right" to "That's a very interesting idea," or "You're doing a fantastic job on sets this week."

Neutral (Category 15):

This is used to code short, relatively noncommittal reactions (frequently unconscious or habitual) which indicate more that the communication was heard and understood than anything else. Examples are "um hum," "yeah," "okay." The reactions may be mildly positive in tone, and may be used when the speaker wishes to make a response, but also withhold any evaluative comment at that point.

Negative (Category 16):

This is the opposite of positive feedback. Comments in this category may range from a simple "no" or "wrong" to the more strongly evaluative "That was stupid" or equivalents.

Corrective (Category 17):

Corrective feedback is a qualified response to another's behavior, indicating to the other that he is off the track or out of line, without making an evaluative comment about that fact. A teacher may respond with "Well" or "Not quite," or by supplying the correct answer, or by simply saying "You've made a mistake." It should not be

a punishing move. Students give corrective feedback when they say, "I don't know" or when they correct another student non-punitively.

Repeat (Category 18):

This is used to code repetition of another's communication. For example, a teacher sometimes repeats a correct answer; in effect underlining it, or she may habitually repeat everything students say. Students sometimes repeat a teacher's communication (such as a correction of pronunciation).

Digression (Category 19):

This is used to code interactions which stray from the substantive focus of a lesson and from the instructional or non-instructional planning and implementation which keep a class organized and moving through classroom activities. A child's observation that today is her birthday in the midst of a discussion of urban problems is a digression.