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ABSTRACT

This paper summarizes results of an ecological analysis designed to generate hypotheses concerning processes involved in learning to meet the demands of the classroom environment. Ethnographic data on student teachers indicates that classrooms are characterized by multidimensionality, simultaneity, and unpredictability. Teachers, in turn, developed strategies, such as chunking, differentiation, overlap, timing, and rapid judgment, to reduce the complexity of these demands. This ecological interpretation suggests that the classroom environment engendered specific teacher response patterns and that environmental demands influence skill utilization in classroom settings. Implications of the ecological approach for teaching research and teacher education are briefly discussed. (Author)

LEARNING THE CLASSROOM ENVIRONMENT: AN ECOLOGICAL ANALYSIS OF INDUCTION INTO TEACHING

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". . . space is not merely a background for events . . ."

--Albert Einstein

Specialists in teacher education have tended to focus on two questions: (1) the identification of specific teaching skills; and (2) the acquisition of teaching behaviors. Considerably less attention has been given to the utilization of teaching skills in the classroom setting or to the impact of naturally-occurring environmental events on teacher behavior. The present paper, drawn from a larger framework for the study of teaching (Doyle, 1977a, 1977b), summarizes the results of an analysis of ethnographic data on environment-behavior relationships in student teaching. The study of student teaching is in large measure a study of induction into the classroom environment. Such an investigation provides a useful basis for generating hypotheses about the processes involved in learning to use teaching skills in the classroom context. The approach also accentuates teacher response patterns that appear to be required by the special demands of the classroom setting.

Deliberation about the nature of teaching skills is generally conducted within a conceptual framework that emphasizes subject matter processing. The emphasis, in other words, is on <u>teaching</u>,

defined largely as actions that engender learning of academic content. Discussions of teaching skills, therefore, commonly focus on a variety of structuring, eliciting, and reacting "moves" (Bellack, Kliebard, Hyman, & Smith, 1966) which are judged effective to the extent that they can be associated with measures of academic achievement (see, especially, Rosenshine, 1971, 1976). Environmental studies (e.g., Gump, 1964, 1969; Jackson, 1968; Kounin, 1970; Smith & Geoffrey, 1968) suggest, however, that the ability to process subject matter--to explain content, formulate questions, praise student responses--represents only a small part of the skill required to establish and regulate activity structures in classrooms. The process of becoming a teacher, as distinct from simply learning how to teach, involves learning an institutionalized role and the enactment of that role in an environment which itself acts upon the teacher (see, e.g., Bossert, 1976; Fiedler, 1975). The present paper is a preliminary attempt to codify some of the competencies necessary to negotiate classroom settings.

Method and Data[1]

For the present study, ethnographic method was used to obtain descriptive records on relationships between environmental events and teacher behavior in student teachers' classrooms. The analysis of these ethnographic records was structured in terms of an ecological model which postulates that environmental demands interact with performance to shape observed behavior and to establish limits on the range of response options. From an ecological perspective, learning to teach involves learning the

texture of the classroom and a set of behaviors congruent with the environmental demands of that setting. The basic features of this ecological model of classrooms have been detailed elsewhere (Doyle, 1977a, 1977b; see also Barker, 1968; Gump, 1969; Westbury, 1973; Willems, 1973). For present purposes, it is necessary to underscore two important aspects of this way of thinking about teaching. First, the sequence of the ecological analysis consisted of: (a) description of behavior in natural surroundings; and (b) a search, conceptually and empirically, for answers to questions concerning the function of these behaviors in that setting. The fundamental question, in other words, is naturalistic: Why do these behaviors occur? The investigative thrust differs, therefore, from that which typically occupies teacher education specialists, viz., what behaviors are the "best" ones and how can teachers be trained to use these more often. This difference can perhaps be illustrated by Rowe's (1974) findings on "wait-time." Rowe found that in classroom discourse duration of pauses after teacher questions and after student responses averaged less than one second. Her attention then turned to the matters of how to change this "wait-time" pattern and what effects a change would have on classroom discourse. (Moderate changes in "wait-time," from one to three seconds, were difficult to achieve but had dramatic effects on the duration and quality of student responses.) The naturalistic question, in contrast, would be: Why does this "wait-time" pattern occur with such regularity in such a wide variety of classrooms? In other words, what is it about a pattern of short pauses in discourse

that makes it uniquely suited to the environmental demands of classrooms? It is this naturalistic question which guides the present investigation of classroom ecology.

The second feature of the ecological approach relates to the matter of the purposes of inquiry. The ecological analysis, in keeping with its ethnographic foundation, was oriented primarily to the domain of discovery rather than verification. The emphasis, in other words, was on description and explanation, on fashioning hypotheses to account for recurring patterns of classroom behavior, rather than on hypothesis-testing, prediction, and generalization (on these issues, see Bronfenbrenner, 1976; Geertz, 1973; Lutz & Ramsey, 1974; Overholt & Stallings, 1976). The process was fundamentally diagnostic, an attempt to interpret environment-behavior relationships in classrooms. There are certainly problems associated with this mode of investigating. Data does not lend itself to succinct displays as in standard empirical reports. Data must, rather, be transformed through conceptual processes into interpretive categories which "fit" observed ecological relationships. It is difficult, however, to reproduce the data base or the conceptual processes involved in transforming the data base. The interpretations summarized in this report often appear, therefore, to go "beyond the information given." Nevertheless, the ecological approach was especially suited to the purposes of the present work and had considerable heuristic value in generating a preliminary list of factors influencing teacher classroom performance.

Observations were made over a three-year period during the

regular course of student-teacher supervision. Although not without limitations, the use of student teacher supervision to gather ethnographic data had at least four distinct advantages. First, student teacher supervision provides one of the few natural observational roles in schools. Access to the classroom setting was, therefore, facilitated. Second, the triadic relationship in student teaching (student teacher, cooperating teacher, and university supervisor) supplied ready access to an experienced teacher's interpretations of the events being observed. Third, repeated observation of the process by which neophytes are inducted into an environment provided a direct opportunity to study ecological relationships. In contrast to the case of skilled performers, the behavior of beginning student teachers was often incongruent with the demands of the classroom environment. As a result, dimensions of the classroom setting and the relationships between these dimensions and teacher behavior were more readily apparent. Finally, it was possible, on occasion, to recommend changes in student teacher behavior and observe the effects of these changes on the pattern of environmental events. This possibility offered some opportunity for checking the accuracy of certain interpretations of ecological relationships in classrooms.

A total of ten different groups of four to eight student teachers were observed during the course of the research. Table 1 provides a summary of the composition of each group and the content areas covered. Descriptive and interpretive records were obtained from a variety of secondary level classrooms, ranging

from middle and upper-middle SES urban and suburban settings to inner city classes of predominantly lower SES students. Most of the standard academic subjects were represented, including social studies, English, speech, mathematics, science, and foreign language. (Classrooms in subject areas which depart from conventional formats, such as art, physical education, and industrial arts, were not included in the analysis.) For groups 1 through 8, observations were conducted for a period of approximately six weeks and for groups 9 and 10, observations were made for sixteen weeks. Each observation was for a full class period (approximately 45 minutes) and individual teachers were observed for an average of one period each week.

The observational records themselves consisted of narrative field notes made according to the following general format. Classroom descriptions were structured in terms of activity segments (e.g., role taking, lecture over new material, review for a test, discussion of reading assignment, etc.) and the sequence of events within these segments (e.g., teacher instructs students to answer questions at end of chapter and begins to rove around the room to help individual students; work involvement estimated at 75%; teacher talks privately with individual student in south-east region of classroom; four students off-task in north-west region, teacher apparently not aware; interruption for afternoon announcements on public address system; work involvement levels estimated at 40%; teacher continues to work with students in south-east region; etc.). Emphasis was on the general flow and duration of classroom events and on recurring environment-behavior episodes.

Interpretations were also recorded as they came to mind, but these were bracketed from descriptive material. In sum, any information was recorded which seemed relevant to the diagnosis of conditions in a classroom. Between observations, records were reviewed for patterns related to the general course of induction into the classroom in an attempt to map the way each teacher learned to accommodate the demands of the environment. In this manner, it was possible to generate 58 natural histories of individual induction sequences.

From a more general methodological perspective, the research involved not only description of classroom settings but also a continuous interpretive process. The work was similar in many respects to the development of a language of classroom events. Concepts derived from previous descriptive studies (principally Barnes, 1971; Bellack et al., 1966; Flanders, 1970; Gump, 1969; Jackson, 1968; Kounin, 1970; Smith & Geoffrey, 1968) were combined to form the rudiments of a language to describe environment-behavior relationships in classrooms. Other concepts were created as necessary to account for events that could not be described with available terms. It is important to emphasize that descriptions were not generated by the standard practices of recording frequencies of discrete categories and calculating statistical associations among these categories. Such methods are useful to reduce descriptions to statistical statements, but this statistical language did not seem adequate to generate meaningful statements about ecological relationships in classrooms.

In addition to observations in school settings, data were

also gathered on the behavior of teacher education candidates in a laboratory setting constructed to reflect selected dimensions of the classroom environment. The laboratory task consisted of the requirement to teach a generalization to a group of five to seven peers during a five minute period using questions only. By restricting teacher behavior to questions, it was possible to replicate a part of the complexity and immediacy of the classroom ecology and to study how inexperienced participants adjusted to and controlled for environmental contingencies. This format also provided an opportunity to concentrate specifically on the problems of learning to use classroom questions. This exercise, begun after the first year of observation in natural classrooms, was completed on six different occasions by groups of approximately 20 students enrolled in beginning teacher education classes.

Findings

It is impossible here to reproduce adequately the descriptive and interpretive records upon which the present analysis of the induction process in teaching is based. The format for reporting consists, therefore, of a summary of the tentative interpretive model of ecological relationships with illustrations drawn from field notes. It is important to point out that at the level of the present analysis similarities across settings were considerably more apparent than differences.

Environmental Demands

The cumulative pattern of observational data indicated that the most salient features of the classroom for the beginning teachers in this study were: (1) multidimensionality;

(2) simultaneity; and (3) unpredictability. Classrooms are multidimensional in the sense that they serve a variety of purposes and contain a variety of events and processes, not all of which are necessarily related or even compatible. Although the rhetoric of teacher training often speaks of "the teacher" and "the student," this idealized dyad seldom exists in a pure form in the natural setting. But classrooms are crowded not only in the sense that they contain a large number of people. They also enclose a large number of activities and purposes, what Mehan (1976) calls multiple "agendas." Upon entering a classroom, a student teacher confronts a wide range of interests and abilities as well as a diversity of goals and patterns of behavior among pupils. In addition, there are multiple public and private levels of operation which include such matters as processing subject matter information, judging student abilities, managing classroom groups, coping with emotional responses to events and behaviors, establishing procedures for routine and special assignments, distribution of resources and supplies, record keeping, interaction with colleagues and administrators, etc. These levels also interact in the sense that ways of dealing with one dimension (e.g., distributing resources and supplies) have consequences for other dimensions (e.g., managing classroom groups) and in the sense that procedures at one point in time establish a precedent which restricts options at a later time. It was not uncommon to find student teachers initially overwhelmed to some degree by the sheer quantity of activities, many of which were seen to interfere with the primary interest in enacting

subject matter sequences in the classroom.

In addition to the quantity of dimensions in classroom settings, many of the events occur simultaneously. The presentation of subject matter in any mode is always accompanied by the requirement to monitor student conduct. In conducting a discussion, for instance, a teacher must attend to the pace of the interaction, the sequence of student responses, fairness in selecting students to answer, the quality of individual answers and their relevance to the purposes of the discussion, and the logic and accuracy of content, while at the same time monitoring a wide range of work involvement levels and anticipating interruptions from internal sources (e.g., student misbehavior) and external causes (e.g., announcements on the public address system). While giving assistance to an individual student during a seat work assignment, a teacher must also remember to scan the rest of the class for signs of possible misbehavior or to acknowledge other students who are requesting assistance. Examples such as these can be easily multiplied for nearly any set of classroom activities. A teacher is indeed, in Smith and Geoffrey's (1968) term, a "ringmaster."

The simultaneous occurence of multiple dimensions, together with the continuous possibility of internal and external interruption, contributes to an unpredictability in the sequence of classroom events, especially for beginning teachers who have not yet learned to anticipate consequences. Student teachers often found it difficult to predict student reactions to a set of material or to judge how much time it would take to complete an

activity. They were also frequently frustrated by changes in the normal schedule, breakdowns in equipment, and interruptions. The fact that classrooms can go in many different directions at any given point in time often made it diff[illegible]udent teachers to enact subject matter sequence[illegible]nt[illegible]ued ways. Indeed, in the folklore of teaching, adaptation to unpredictability is called "flexibility."

This characterization of classrooms in terms of multidimensionality, simultaneity, and unpredictability is not especially original. Jackson (1968) and Smith and Geoffrey (1968), among others, have written similar descriptions. But this perspective on classroom environments is remarkably absent from discussions of basic teaching skills. Moreover, these aspects of the classroom are seldom analyzed in ecological terms as demands which affect the implementation of different instructional procedures and engender a set of teaching skills distinct from those which are necessary to process subject matter. With regard to implementation, it is clear from this research (see also Gump, 1964, 1969) that different activity structures affect the magnitude of environmental demands. Sequences of higher cognitive questions, in contrast to lectures, for example, typically involved more intense levels of multidimensionality, simultaneity, and unpredictability. From an ecological perspective, higher cognitive questions are simply questions with a larger number of optional answers. Therefore, the direction of the sequence was more unpredictable and the teacher was required to attend to a more complex judgmental process in interpreting student responses. In addition, the

duration of individual utterances as well as the "wait-time" between utterances was longer than in the case of recall questions. These factors influenced the pace of question sequences and the work involvement levels of the classr om group. Establishing and sustaining sequences of higher cognitive questions c ainly involved more than the ability to formulate these question types.

A similar pattern of variation in the magnitude of environmental demands was observed to be associated with seating arrangements. Arrangements which increased the density of students and the amount of face-to-face contact among individuals (e.g., tables instead of desks) or established natural barriers between students and the teacher (e.g., language laboratories) intensified the complexity of the task of monitoring classroom groups. More conventional arrangements of rows of desks all facing the front of the class made it easier to monitor the group and to become aware of student disturbances early. One especially complex activity structure was created by a student teacher in a physical science lesson on the speed of moving bodies. Four stations were set up in the classroom and each station contained a different set of objects (blocks of wood, balls, blocks with wheels, etc.) for use in experiments on motion. The students, of relatively low academic ability, were to work in groups of six and rotate through each station during the class period. The tasks at each station involved fairly high levels of inherent activity and noise and instructions to the students were left intentionally open-ended. During the course of the class period, the teacher encountered numerous problems of accommodating differences in the

completion rates at each station, in providing assistance to groups when it was needed, and in managing student conduct.

In addition to these variations associated with different activity structures, there appeared to be some evidence of a discontinuity between the demands of classroom environments and those of other situations experienced student teachers. Few student teachers had ever been responsible for managing the activities of groups of some 25 individuals for such long periods of time. Many reacted initially by "localizing," by attempting, that is, to interact primarily with students in a small geographical region of the classroom. In addition, many academically successful students had a natural inclination to ignore distractions in order to concentrate exclusively on subject matter considerations. Such a pattern was often incongruent with the multidimensionality and simultaneity of the classroom environment which appears to demand distractibility. Although the hypothesis was not systematically tested, it seemed that students with extensive tutoring experience prior to student teaching had particular difficulties in adjusting to the complexity of the classroom setting. In sum, the observations indicated that the features of multidimensionality, simultaneity, and unpredictability created a special set of environmental demands unique to the classroom. As a result, student teachers not only lacked specific skills to negotiate classrooms but also found skills transferred from other settings were not always congruent with classroom demands.

Adaptive Strategies

Analysis of behavioral data indicated that all teachers

evolved an initial set of response patterns which functioned to reduce in various ways the subjective complexity of the classroom environment. There was, however, considerable variation among teachers in the long-term success of their strategies for adjusting to environmental demands. Certain ways of reducing complexity were simply incongruent with the demands of the classroom ecology. Several student teachers, for example, chose to ignore simultaneity by focusing exclusively on one event at a time. In most instances this meant either ignoring or failing to enforce procedural accountability for pupils. In one especially dramatic case, a social studies student teacher at the junior high school level habitually concentrated on subject matter considerations only. During one presentation, a pupil in the left rear corner of the classroom removed a section of molding from the chalkboard ledge and passed it forward in the row. The student teacher, engrossed in the presentation (which was directed primarily to the right front section of the class), did not become aware of the molding until it reached the front desk in the row. The teacher then reprimanded the pupil in the left front desk who was, for all practical purposes, an innocent bystander. The net result of this episode and others of a similar nature was to intensify over time the level of student disruption and hence increase the complexity of environmental demands in the classroom. It seemed, in other words, that pupils expected student teachers to exhibit not only competence in presenting subject matter but also some tactical skill in managing the direction and flow of classroom events.

Successful strategies for adapting to environmental complexity tended to incorporate a reasonably identifiable set of teacher skills. A preliminary attempt to codify these skills produced the following categories:

1. chunking, or the ability to group discrete events into larger units;
2. differentiation, or the ability to discriminate among units in terms of their immediate and long-term significance;
3. overlap, or the ability to handle two or more events at once (this concept was adapted from Kounin's (1970) analysis of classroom management skills;
4. timing, or the ability to monitor and control the duration of events; and
5. rapid judgment, or the ability to interpret events with a minimum of delay.

Discussions with cooperating teachers during the three-year course of the present research suggested that these skills map a part of the tacit knowledge experienced teachers have about the way classrooms work.

The first two skills, chunking and differentiation, would seem to form part of the fundamental interpretive competence necessary to negotiate classroom demands. As the terms imply, student teachers undergo a concept formation process during which they learn to conceptualize classroom events and processes in ways that are relevant to the demands created by multidimensionality, simultaneity, and unpredictability. In describing pupils, for

instance, successful student teachers learned to classify individuals in terms of their potential for disruption, skills in classroom tasks, inclinations to participate in lesson activities, attitudes toward the teacher, etc. They knew that the movement of some students around the room to secure supplies or sharpen pencils could be ignored whereas the movement of other students required careful monitoring. Similarly, successful teachers learned to judge content in terms of how students would react to it and how difficult it would be to implement in the classroom, in contrast to those who retained purely academic criteria for content adequacy. In sum, accurate concept formation was directly related to the reduction of interpretive errors and the ability to anticipate the direction and flow of classroom activities. Over time, successful student teachers developed skill in differentiating among a greater number of dimensions and in making judgments rapidly. The basic role of this interpretive skill in coping with environmental demands suggests that during the first few days in the classroom the student teacher is especially vulnerable.

The interpretive facet of learning the classroom environment parallels in several respects the work on teacher expectations. Brophy and Good (1974), for instance, have provided a large body of behavioral data and an excellent analysis of the ability of experienced teachers to classify individual students, especially those at the extremes on various dimensions of ability and conduct, and to make these judgments rapidly. In the popular rhetoric of teacher education, these teacher expectations are seen as

unfortunate manifestations of personal bias, particularly when classifications correspond to various ethnic patterns. From an ecological perspective, teacher expectations are viewed as adaptive responses to the complex environmental demands of the classrooms. This is not to say that personal bias toward individual students is justified or that expectations do not have negative consequences; rather it suggests that the origins of these expectations might have origins in the ecology of the classroom rather than simply in the personal wishes of the teachers. Changing expectations becomes, therefore, more than simply changing teachers.

The skills of overlap and timing supplement the interpretive strategies of chunk ng, differentiation, and rapid judgment in ways that enable successful student teachers to regulate classroom demands to some degree. The need for overlap is a continuing condition in classrooms. Successful teachers were able to divide attention between the several simultaneous dimensions of classroom activity structures and to be readily distractible by changes in sound or movement in the classroom. Indeed, student teachers often complained that their cooperating teachers were impatient or inattentive in conversations. A brief attempt to analyze these situations suggested that experienced teachers, especially those who were skilled in managing classroom demands, were highly distractible. Overlap also appeared to have a relationship to physical position in the classroom. Many student teachers initially positioned themselves in such a way that their view of the rest of the room was restricted. They would consult with

individual students, for example, with their backs to the classroom group. This issue of position in the classroom merits further investigation. In one instance, a social studies student teacher in a high school setting consistently avoided moving toward regions of the classroom which contained a high frequency of disturbance. Over time, the level of disruption from these [illegible] increased. Successful student teachers, on the other hand, tended to move toward disruptions.

Over the course of the observations, timing emerged as an especially salient skill for managing classroom demands, one that operated on several levels. It was apparent, for example, that timing was related to the effectiveness of directives to individual students (e.g., "Stop talking and get back to work!"). Successful managers tended to pause and continue to gaze at the target student for a brief period after issuing such a directive. The target student typically returned to work immediately after receiving the directive, but looked up again in one or two seconds. If the teacher was still monitoring the student, there was a greater likelihood that the directive would be followed. Unsuccessful managers, on the other hand, tended to issue directives and continue on as if compliance had been achieved. Over time, this latter pattern seemed to result in directives being ignored and therefore repeated more frequently.

Timing also became a critical managerial variable in conducting seat work. In the typical seat work activity, the teacher would respond to individual students who requested assistance. At times, two or more hands were raised at once to solicit teacher

help. Successful managers were able to acknowledge more than one student's request and to schedule attention in the order solicited, that is, establish a "first come, first serve" pattern. Unsuccessful managers, on the other hand, tended to bounce around in a random pattern to students who happened to distract them at a given point in time. This approach was often followed by shouts to get the teacher's attention and by complaints about the teacher's "fairness."

One especially interesting timing mechanism was discovered on a rare occasion in which it was possible to observe a cooperating teacher's class. During the course of the period (a junior high social studies class), the following exchange occurred:

S: When is the homework due?

T: All homework assignments are due on Tuesdays. (This class was meeting on a Thursday.) Are you already finished?

S: Yes.

T: Did you answer all the questions?

S: Yes.

T: Are all the lines straight?

S: (Pause) I guess I better check.

T: (To class) Don't be in such a hurry to get your homework done that you aren't careful.

The last three comments required some interpretation. The observer's initial reaction to the teacher's comment "Are all the lines straight?" was one of surprise: what did this have to do with social studies? The student's reaction, however, was not

surprise but appeared to be one of recognizing a requirement that had been overlooked. In light of the final remark, it seemed that the teacher, a fifteen-year veteran of the classroom, had established contingencies that served to slow down students who happened to get too far ahead on assignments. It was subsequently found that in a study of programmed instruction, teachers were observed to use devices to speed up slow students and slow down fast students in order to reduce the difference in work output (see Carlson, 1965). From an ecological perspective, differential work rates would certainly seem to increase the complexity of the record-keeping tasks of the teacher, among other considerations. It is not totally unexpected, therefore, that teachers would develop procedures for keeping students together. This perspective would seem to have implications for interpreting recent studies on curriculum pacing (Arlin & Westbury, 1976; Good, Grouws, & Beckerman, in press).

A similar pattern of complexity reduction was apparent in the performance of teacher education candidates in the laboratory questioning task. Participants responded to the requirement to teach using only questions by incorporating a variety of means for controlling the flow of information and therefore increasing the predictability of the instructional sequence. Control mechanisms included such techniques as asking low option questions, interpreting student responses to fit predetermined patterns, increasing nonverbal cues for right answers, ignoring student answers which deviated from expectations, and increasing the pace of the sequence. Indeed, many participants found it difficult

to avoid using some form of exposition in order to reduce the complexity of the laboratory task. This laboratory task on questioning was significant in two ways. First, in natural classrooms successful managers tended to avoid establishing activity structures which intensified the demands of the environment. As a result, sustained questioning sequences above the level of recall were seldom observed in these settings. The laboratory task gave some basis for studying how beginning teachers adapt to the demands of this particular mode of teaching. Second, the task would seem to have a degree of ecological representativeness useful for studying teaching under controlled conditions. By limiting teacher behavior to questions, it was possible to replicate some of the multidimensionality, simultaneity, and unpredictability of natural classrooms. This approach would seem to merit further attention as a research setting and as a means of orienting teacher education candidates to the classroom ecology.

In summary, it is perhaps useful to present a case in which a student teacher illustrated the range of interpretive and managerial skill which has been identified here as necessary elemented in adapting to the environmental demands of classrooms. On this occasion, in a high school speech class, the student teacher instructed the students at the beginning of the period to form groups (assignments had been made on a previous day) to work on team projects. During the transition, one student in the center of the back of the class folded his arms and made no move to join a group. The student teacher became aware of this

situation very early in the transition, moved to the student, and made a brief private comment (he later reported that he simply told the student to get to work). The teacher then returned to the front and monitored the rest of the transition. The entire incident took approximately 15 seconds. By this time, the groups had formed and the student in the back of the room announced that he had decided to work that day, after which he joined a group. By recognizing the situation early, interpreting it correctly, and acting decisively and at a private level, the student teacher was able to avert a major public confrontation that would have potentially had long-term consequences for the direction and flow of classroom activity.

Conclusion

The present research, although tentative and incomplete, suggests that the process of learning the classroom environment involves learning a set of specific strategies for reducing complexity. The particular nature of the classroom ecology would also appear to restrict the range of response options available for reducing environmental demands. This ecological approach to teacher behavior has a number of implications for teaching research and teacher education design. It is possible, for example, that the classroom environment is a substantially more important factor in shaping teacher behavior than has been conventionally recognized and that some teaching skills only become usable after the teacher has first mastered classroom demands. It is also likely that preparatory experiences under conditions that lack ecological representativeness (e.g., tutoring) may be useless

or even detrimental in preparing a beginning teacher to learn the classroom environment. Finally, the ecological approach may provide a means of identifying important teaching skills which have received little previous attention but which are a fundamental part of the tacit knowledge gained by the experience of being a teacher.

References

Arlin, M., & Westbury, I. The leveling effect of teacher pacing on science content mastery. Journal of Research in Science Teaching, 1976, 13, 213-219.

Barker, R. G. Ecological psychology. Stanford: Stanford University Press, 1968.

Barnes, D. Language in the secondary classroom. In London Association for the Teaching English, Language, the learner and the school (Rev. ed.). Baltimore, Md.: Penguin Books, 1971.

Bellack, A. A., Kliebard, H. M., Hyman, R. T., & Smith, F. L. The language of the classroom. New York: Teachers College Press, 1966.

Bossert, S. T. Studying learning environments: Conceptual and methodological issues. Paper presented at the meeting of the American Educational Research Association, San Francisco, April 1976.

Bronfenbrenner, U. The experimental ecology of education. Educational Researcher, 1976, 5(9), 5-15.

Brophy, J. E., & Good, T. L. Teacher-student relationships: Causes and consequences. New York: Holt, Rinehart and Winston, 1974.

Carlson, R. O. Adoption of educational innovations. Eugene, Ore.: Center for the Advanced Study of Educational Administration, University of Oregon, 1965.

Doyle, W. Paradigms for research on teacher effectiveness. In L. S. Shulman (Ed.), Review of research in education (Vol. 5). Itasca, Ill.: F. E. Peacock, 1977. (a)

Doyle, W. The uses of nonverbal behaviors: Toward an ecological model of classrooms. Merrill-Palmer Quarterly, 1977, 23(2), in press. (b)

Fiedler, M. L. Bidirectionality of influence in classroom interaction. Journal of Educational Psychology, 1975, 67, 735-744.

Flanders, N. A. Analyzing teacher behavior. Reading, Mass.: Addison-Wesley, 1970.

Geertz, C. The interpretation of cultures. New York: Basic Books, 1973.

Good, T. L., Grouws, D. A., & Beckerman, T. M. Curriculum pacing: Some empirical data in mathematics. Journal of Curriculum Studies, in press.

Gump, P. V. Environmental guidance of the classroom behavioral system. In B. J. Biddle & W. J. Ellena (Eds.), Contemporary research on teacher effectiveness. New York: Holt, Rinehart and Winston, 1964.

Gump, P. V. Intra-setting analysis: The third grade classroom as a special but instructive case. In E. P. Willems & H. L. Raush (Eds.), Naturalistic viewpoints in psychological research. New York: Holt, Rinehart and Winston, 1969.

Jackson, P. W. Life in classrooms. New York: Holt, Rinehart and Winston, 1968.

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

Lutz, F. W., & Ramsey, M. A. The use of anthropological field methods in education. Educational Researcher, 1974, 3(10), 5-9.

Mehan, H. Ethnomethodological reflections on socialization in education. Paper presented at the meeting of the American Educational Research Association, San Francisco, April 1976.

Overholt, G. E., & Stallings, W. M. Ethnographic and experimental hypotheses in educational research. Educational Researcher, 1976, 5(8), 12-14.

Rosenshine, B. Teaching behaviours and student achievement. Windsor, Berkshire, England: National Foundation for Educational Research in England and Wales, 1971.

Rosenshine, B. Classroom instruction. In N. L. Gage (Ed.), The psychology of teaching methods. Seventy-fifth Yearbook of the National Society for the Study of Education, Part 1. Chicago: University of Chicago Press, 1976.

Rowe, M. B. Wait-time and rewards as instructional variables, their influence on language, logic, and fate control: Part one--wait-time. Journal of Research in Science Teaching, 1974, 11, 81-94.

Smith, L. M., & Geoffrey, W. The complexities of an urban classroom. New York: Holt, Rinehart and Winston, 1968.

Tinbergen, N. Functional ethology and the human sciences. Proceedings of the Royal Society of London, Series B, 1972, 182, 385-410.

Westbury, I. Conventional classrooms, "open" classrooms and the technology of teaching. Journal of Curriculum Studies, 1973, 5, 99-121.

Willems, E. P. Behavioral ecology and experimental analysis: Courtship is not enough. In J. R. Nesselroade & H. W. Reese (Eds.), Life-span developmental psychology: Methodological issues. New York: Academic Press, 1973.

Footnote

[1] For an especially useful discussion of many of the methodological issues raised in this section, see Tinbergen (1973).

Table 1

Summary of Subjects, Schools, and Content Area Observed

Group	Total	Male	Female	Junior High	Senior High	Social Studies	English	Speech	Math	Science	Foreign Language
1	4	2	2			3	1				
2	5		5		5		3	2			
3	4		4		1		2				2
4	5	1	4		3	1	3		1		
5	5	4	1		2	4					1
6	6	1	5		1	4	2				
7	5	2	3	4	1	4			1		
8	8	4	4	4	4	5	1	2			
9[a]	8	3	5		8	3	2	1		2	
10[a]	8	4	4		8	3	2	1		1	1
Total	58	21	37	25	33	27	16	6	2	3	4

[a]Denotes school with predominantly lower SES students.