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ABSTRACT

The basic model of concepts and measures developed for the Principal-Teacher Interaction Study is described. School organizational climate and contextual variables were defined to be consistent with the work of researchers in industrial and military settings. Many of the variables were generic to any type of organization. The model and variables were: PC = f(S, P, PxS, RI). PC represents psychological climate and describes the individuals' perception of his or her organization; S represents the situation; P is for personal characteristics; RI signifies the reciprocal interaction that occurs when the individual's perception of the climate influences S, P, or PxS. A distinction is made between the individual's perception of organizational attributes (PC) and the composite climate, which can be represented by summing the individual PC's. The measure developed to assess the variables was entitled the School Ecology Survey. Items for the survey were drawn from the Organizational Climate Questionnaire, DDAE/CRITERIA, Building Questionnaire, Trouble Shooting Checklist, and School Climate Questionnaire. The authors used the School Ecology Survey to assess the psychological climate in the district and school surveys they conducted. (DWH)

ANALYZING CONTEXT/CLIMATE IN SCHOOL SETTINGS--

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Paper presented at the annual meeting of the
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ANALYZING CONTEXT/CLIMATE IN SCHOOL SETTINGS--

WHICH IS WHICH?[1,2,3]

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The work on context/climate seems to have resulted in more data than variables.

The Research on the Improvement of Practice Program at the Texas R&D Center has been conducting an in-depth study of nine elementary school principals in relation to their role as change facilitators. The principals were located in three different school districts in three different parts of the country. The primary focus of the study is on identifying and analyzing the "interventions" that principals make in relation to implementation of particular educational innovations. The study is also exploring the existence of three hypothesized change facilitator styles that the study principals represent in varying degrees.

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[1]Paper presented at the annual meeting of the American Educational Research Association, New York City, March 1982.

[2]The research described herein was conducted under contract with the National Institute of Education. The opinions expressed are those of the authors and do not necessarily reflect the position or policy of the National Institute of Education. No endorsement by the National Institute of Education should be inferred.

[3]The authors wish to acknowledge the contributions and participation of their co-workers in this study: Shirley Hord, Leslie Huling, Nova Washington, Bill Rutherford, Beulah Newlove, Marcia Goldstein, Terry Needham, Sue Loucks and Suzie Stiegelbauer. We also wish to acknowledge the valuable assistance that has been so willingly given by the principals and teachers who participated in the studies.

A problem that the study design had to address was identifying common and unique characteristics of the school settings and the districts at large that might be affecting the major study variables. Some sort of procedure(s) and measurement system(s) were needed for annotating potentially significant features of the "context" and documenting basic descriptive information about each of the schools and their respective districts.

Although identification of the need was reasonably obvious and straightforward, identifying appropriate conceptual and methodological resources turned out to be difficult and time consuming. There is a vast literature on context/climate/environment/ecology and many concepts for which there were related measures; however, locating measures for which there were clearly defined variables as well as basic psychometric properties was not easy. As Lawrence R. James and Allan P. Jones point out:

> Organizational climate research occupies a popular position in current industrial and organizational psychology. However, conceptual and operational definitions, measurement techniques, and ensuing results are highly diverse and even contradictory. (James & Jones, 1974, p. 1096).

Our own search of the educational literature suggested that the education related work on climate is equally undefined and promises more than it can deliver. In the end, work that had been done in industry and the U.S. Navy served as the foundation for how context was handled in our study.

Thus what began as a basic need to develop standard background information on each of three districts and nine study schools turned into a major search for conceptual frameworks, variables and measures, and finally measurement development activities. Now we can report, with relief, that we have located some expertise, frameworks that are operationally defined and measures that have basic psychometric qualities. These have been used to identify and describe basic contextual and climate information. In this

paper we report on these frameworks and measures and how they were adapted for use in school settings.

In the next section a brief history of the steps that we took to identify concepts and procedures are summarized. Following that is a review of key literature and then the basic model that we are relying on is described. The different measures that were developed for assessing Psychological Climate and for describing the district and school situations are then described. The paper concludes with illustrations of sample findings and a brief discussion of possible future applications.

Overview of the Search

The search for terms and measures that would have utility in the Principal-Teacher Interaction Study extended over an eighteen month period prior to initiation of the study. The project staff initially reviewed literature that was available through ERIC searches and the Center and University libraries. This review yielded information about the numerous measures that had been developed and used in various educational studies during the last forty years to describe climate and/or context.

To become more conversant with recent frameworks and measures, several experts were asked to consult with the project staff and to conduct training sessions based on some of the more popular models. For example the staff received training in the Situational Leadership model of Blanchard and Hersey (1974) and considered whether the measures that had been developed in relation to this model could be used in a research study.

Principal investigators of recent climate and context studies were contacted and asked to share their variable definitions and measures. Key staff from NIE, especially Joe Vaughan and Michael Cohen, shared what other NIE funded studies were doing. Gradually the search broadened into the

industrial psychology literature. A key consultant for catalyzing this broadening of the search was Drea Zigarmi of Zigarmi Associates of Escondido, California, who had just completed an extensive search of the climate literature. Zigarmi linked the project staff to the seminal piece by James and Jones (1974) in which they summarized an extensive review, analysis and critique of the organizational climate literature.

Based on this paper Lawrence James, now of the Georgia Institute of Technology, was asked to consult with the project staff and explain his work further. This turned out to be a key step, since Professor James possesses extensive knowledge of the literature, and related conceptual and measurement issues. He also has a strong quantitative orientation.

The outcome of these discussions and further readings was the acceptance of the basic model that James and his colleagues have been using. The project staff then used this framework to guide development of three measures that could be used to assess various aspects of what can loosely be called context. These measures are described later in this paper following a review of key literature.

Review of the Literature

Teacher change does not occur in a vacuum, or entirely "behind closed doors." New information and skills can provide the impetus for changes in a teacher's classroom practices, but the physical conditions of the school, its organizational structure, norms, expectations and other persons in the school influence and place boundaries on what an individual teacher does. Research on effective schools has implied that changes in school factors will also improve student learning, but unfortunately there is no strong evidence to date that shows us how school factors impact upon the classroom (Koehler, 1981).

The relationships between school variables and the behavior of teachers have been investigated in numerous studies of school "climate" or "context," but a survey of the literature shows that these terms have not been used in any uniform way. School climate has been investigated more frequently but with varying definitions, and it has not been consistently distinguished from school structure or context. The educational research and staff development literature has not been unique in its confusion over these concepts; it has generally reflected trends in industrial psychology and organizational development literature. A brief review of the literature that has addressed the context or the climate of schools and other organizations will illustrate the problem.

Structure. Several large-scale, cross-sectional surveys, notably the Coleman report on Equality of Educational Opportunity (1966), have investigated the relationships between specific organizational characteristics and educational outcomes. These early reports concentrated on structural attributes of the school, such as school facilities, staff characteristics, and curriculum. The structure of the individual school has been described more recently by a staff developer/researcher as including "the overt structure of activities, settings, and schedules and the latent or hidden structure of the informal rules, conventions, norms, and expectations that define acceptable behavior (Miller, 1980, p. 168)." On the other hand, the latent structure referred to here is elsewhere used as a school climate variable. Other reports have used student characteristics or school organization as proxies for school climate (Anderson, 1970; O'Reilly, 1975).

Climate. The major attempt to define and test the concept of school organizational climate has been the creation of the Organizational Climate Description Questionnaire (OCDQ) (Halpin & Croft, 1963). The questionnaire

uses teachers' responses to Likert-type items about group characteristics and leader characteristics to fit a school into one of six organizational climate "types." The OCDQ has been widely used as a descriptive tool, but neither the empirical work demanded for validation nor the conceptualization for theory construction has been fully developed or internally consistent.

Subsequent studies refer to school "climate" to describe the general atmosphere pervading the school. For example one factor accounting for differences in effectiveness among schools is described as "a school climate conductive to learning; that is, a safe and orderly school relatively free of discipline and vandalism problems" (Cohen, p. 59GS). Other researchers are more specific about what they mean by climate. Brookover and his colleagues define school climate as:

> A composite of variables as defined and perceived by the members of this group. These factors may be broadly conceived as the norms of the social system and expectations held for various members as perceived by the members of the group and communicated to members of the group (Brookover et al., 1973, p. 302).

The social structure involves the formalized administrative structure, classroom organization and time allocation, the characteristics of role definitions within the school, and the pattern of relationships between students and teachers (Brookover et al., 1979, p. 14). Their research distinguishes between school climate, school social inputs, and school structure. Social inputs are such things as mean teacher salary, teacher-pupil ratio, school size, teachers' experiences, education, tenure in the school, and average daily attendance. The authors make valuable distinctions, but their distinctions were not in common usage in the educational research community and were published after the CBAM project had developed a framework based on the industrial psychology literature.

Turning to the organizational psychology literature, we found that here

also "climate researchers were confused as to whether climate was an organizational attribute or an individual attribute" (Guion, 1973). In a review of the organizational climate theory Lawrence James and Allan Jones, then of the Institute of Behavioral Research at Texas Christian University found three separate but not mutually exclusive approaches to defining and measuring organizational climate. The authors have designated these approaches as the"multiple measurement-organizational attribute approach" which regards organizational climate exclusively as a set of organizational attributes; the "perceptual-measurement organizational attribute approach" which views organizational climate as a set of perceptual variables which are still seen as organizational attributes; and the "perceptual measurement-individual attribute approach" which views organizational climate as perceptual and as an individual attribute (1974, 1096-1097). Their review showed that in the general body of literature, as in the education specific literature, climate had been used as a global or summary concept and tended to duplicate other characteristics referred to as context, structure, process or perceptions.

In conclusion, James and Jones suggested distinctions that proved useful for the CBAM project in conceptualizing the context/climate of schools. They recommended that a differentiation be made between climate as an organizational attribute and climate as an individual attribute. The term "organizational climate refers to organizational attributes, main effects, or stimuli while psychological climate refers to individual attributes, namely the intervening psychological process whereby the individual translates the interaction between perceived organizational attributes and individual characteristics into a set of expectancies, attitudes, behaviors, etc." (James & Jones, 1974, p. 1110).

A Model

For the study the decision was made to define climate and contextual variables in ways that would be consistent with the work that James and Jones had been doing in industrial and military settings. Many of their variables were generic to any type of organization and the overall assumptions and terminology are literature based and have an internal consistency. In addition, the emphasis on defining climate in terms of the individual was parsimonious with the assumptions of the Concerns-Based Adoption Model which underlies our study.

The basic model and variables are as follows:

$$PC = f\ (S, P, PxS, RI)$$

Where

PC stands for psychological climate and is the cluster of variables that describe the individuals' perception of their organization.

S represents the situation, which includes the various structures, processes, system values, norms, and the physical environment.

P symbolizes characteristics of the person, including personality, demographic and experiential variables.

RI signifies the reciprocal interaction that occurs when the individual's perception of the climate influences S, P, or PxS.

Basically James and his associates have proposed that an individual's perception of organizational attributes is a function of the Setting (S), characteristics of the Person (P), interactions between the person and situation (PxS), and the reciprocal interaction (RI) that results from the person's perceptions of the organization influencing values of the other vectors (1980).

With this framework a distinction is made between the individual's perception of organizational attributes (PC), and the composite organizational

climate, which refers to organizational attributes, and can be represented by summing the individual PC's (1979).

As with any model, this one offers particular strengths and potential weaknesses. For our research needs it offered several salient strengths. There was a research base, the specific variables and the vectors had been defined and related one to the other. There were measures available for assessing PC and we could envision a strategy to use in assessing S. An additional merit of this model was that it addressed many of the intuitive feelings and field experiences that the project staff had been describing during the extended search for climate/context variables and measures.

Measurement Approaches

Once the array of variables that could be measured were identified then measurement development began. Fortunately, James was able to offer us extensive lists of PC variables that had been shown to be meaningful in past research and to suggest questionnaire items that could be used for measuring them. By adapting Jones' items to educational settings and incorporating items for some variables from previously developed educational climate measures, a prototype 17 scale PC measure took shape and was given the name, School Ecology Survey.

Developing a measurement procedure to assess S was more interesting. No measures were available for this one. The various components that James and Jones (1974) had identified (see Figure 1) were reviewed. Those items that were considered relevant to the study were identified and some additional variables were added by the staff. Two primary data sources seemed to be most related to assessing these variables, the school building and the central office. Further, it was clear that obtaining these data required a "fair

SITUATION VARIABLES

Figure 1

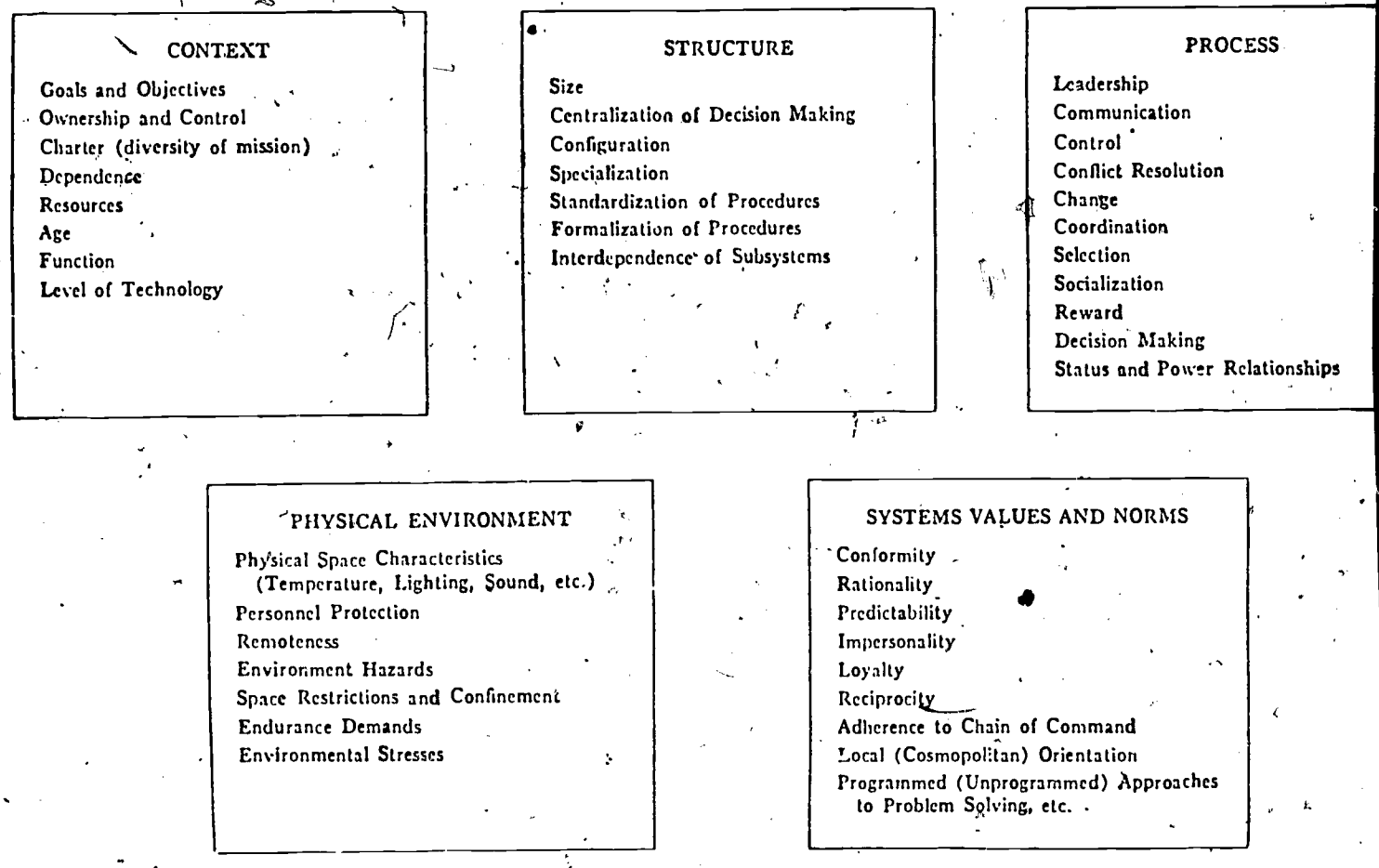

FIGURE 1. Components of situational variance in the total organization, major subsystems, and $1 \ldots k$ groups.

From: James, L. R. & Jones, A. P. Organizational climate: A review of theory and research. Psychological Bulletin, 1974, 81(12), 1096-1112.

witness" or independent observer.

These are not perceptual variables, rather they are more factual statements of what is true for a particular setting. As a result it was decided that much of the information would be collected directly by the research staff from first hand observation, review of school and district documents and asking specific questions of reasonably objective on-site informants. To record the S findings two survey logs were developed, the District Survey and the Building Survey.

P was assessed along one dimension only, Stages of Concern about the innovation (Hall & George 1978). The study was designed to assess the concerns of the teachers and the principal in relation to their roles in implementation; the measures already existed. Some additional personal and demographic information were also collected.

PxS is not a variable that is measured directly. Rather this is an analysis question that is addressed by hypothesizing how different kinds of persons will perceive the organization when placed in different situations. For example, if persons who have high management concerns are placed in a high structure situation they are more likely to have high morale than if they are placed in a low structure situation. Various scenarios of this type are hypothesized and then can be tested empirically as Jones, James, Bruni, Hornick and Sells (1979) have done. The Reciprocal Interaction is also not measured directly but inferred from how values on particular variables change elsewhere in the equation. The measures are described in more detail in the next section of this paper.

Climate Questionnaire Construction

James and Jones identified 35 composite variables that "had been shown by previous research to be internally consistent, psychologically meaningful

measures of the work environment" (James and Jones, 1979) and developed a questionnaire that has been used and validated in studies of the perceptions of climate of firefighters, navy midshipmen, and health care professionals. The variables represent characteristics of an individual's job and role, workgroup, organization, and the leadership of his or her supervisor. Fifteen of these variables and two additional variables that were thought to have special relevance in schools settings were selected to use in our prototype questionnaire. The variables were:

1. Role Ambiguity
2. Role Conflict
3. Job Autonomy
4. Job Importance
5. Job Pressure
6. Leader Support
7. Leader Goal Emphasis
8. Leader Work Facilitation
9. Leader Interaction Facilitation
10. Leader Upward Interaction
11. Leader Confidence and Trust in Teachers
12. Workgroup Cooperation, Friendliness and Warmth
13. Openness of Expression
14. Esprit de Corps
15. Planning and Effectiveness
16. Decision-Making Characteristics
17. Student Characteristics

The next step was to design the Psychological Climate Questionnaire for use in the PTI Study. The final measure is called the School Ecology Survey. Five questionnaires provided items for the Survey: Organizational Climate Questionnaire (James, 1980), DDAE/CRITERIA (Culvert & Hoban, 1973), Building Questionnaire (DESSI, 1979), Trouble Shooting Checklist (Manning, 1976), and School Climate Questionnaire (Fox 1974). A total of 211 items from these questionnaires were initially sorted by staff members according to the 17 variables. The Organizational Climate Questionnaire had already been sorted

by James and Jones during validation of the instrument, and these scales were maintained. All staff members were asked to look at the definition of each variable and choose the five items that s/he felt would be the best measures of that definition; some rewording of items and moving of items between variables were allowed. The entire staff then met to come to consensus on 5 items per scale. The prototype questionnaire was finalized, and administered to teachers in the PTI study. An example page from the questionnaire is included as Figure 2.

Validation of the Climate Questionnaire. An initial factor analysis was performed on 85 items targeted to the 17 variables that the items were thought to measure. Based on this factor analysis 22 individual items from different scales were dropped and four items were moved from the initially targeted variables. The items in two scales, Leader Upward Interaction and Job Pressure, did not consistently fall into the targeted scales or any other scale; the decision was made to write new items for these two scales.

At this point several tests were done on the remaining 56 items/15 scales. First, each staff member rated how they thought the teachers in their assigned school would respond to the SES variables, using a 3 point scale and referring to the James and Jones (1979) definitions of the variables. The researchers considered the task difficult. On a school by school correlation of the researcher rankings with the actual responses, five researchers agreed with the aggregated school scores with a 5% significance level on a 2-tail probability test (Figure 3). Only one researcher was completely off-base in the assessment; on looking more closely at the data for that school, it appeared that the intermediate and primary teachers formed two distinct subgroups in their school and they answered the questions quite differently.

Figure 2

Section IV

For each of the next group of items, choose one of the following answers:

1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree

1.	It is up to me to decide how my job should best be done.	1	2	3	4	5
2.	My work is highly important.	1	2	3	4	5
3.	It is easy to get my ideas across to my principal.	1	2	3	4	5
4.	Amost all students in this school achieve their potential.	1	2	3	4	5
5.	In my school, the principal respects the opinions and beliefs of teachers.	1	2	3	4	5
6.	I do things in my work that are likely to be accepted by some and not accepted by others.	1	2	3	4	5
7.	In my school, both principal and teachers participate in making decisions which affect the school.	1	2	3	4	5
8.	I have influence on the decisions within the school which directly affect me.	1	2	3	4	5
9.	Teachers in this school are "alive;" they are interested in life around them; they are doing interesting things outside of school.	1	2	3	4	5
10.	In my school, the principal promotes openness in the staff.	1	2	3	4	5
11.	When important decisions are made about the programs in the school, I personally have heard about the plan beforehand and have been involved in some of the discussions.	1	2	3	4	5
12.	In my school, meetings are such that persons can engage in an open and frank discussion of issues.	1	2	3	4	5
13.	Teachers in this school are "out in front," seeking better ways of teaching and learning.	1	2	3	4	5

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Figure 3

RESEARCHER-SCHOOL VALIDITY CORRELATIONS BY SITE

Site	Corr	Prob
1	.638	.007
2	.350	.110
3	.648	.006
4	-.018	.476
5	.446	.055
6	.533	.025
7	.787	.001
8	.541	.023
9	.277	.169

Because these scores were aggregated, the researcher was unable to judge how the whole group would respond.

On a correlation test of the agreement between researcher judgment and teacher responses on each variable, the researcher/response correlations on Variables 3, 11, 12, 13, 16 and 17 ranged from .680 to .894, showing significance at a 5% probability level (Figure 4). The correlations on variables, 6, 7, 8, and 14 ranged from .582 to .641, showing a significant correlation at a 10% probability level.

Another test on the first version of the SES was to check for internal consistency. A factor analysis was executed on the 13 variables (variables 1 and 2 were combined; variable 17 was not done because it had only two good items). Reliability estimates (coefficient alpha) for these variables range from .59 to .91 (Figure 5).

Refinement. The SES has a conceptually sound structure with 54 items measuring 15 variables. The next step in refinement has been to construct completely new items for 2 variables and to add items to two other variables, so that each variable has 3-5 items. As a next step a new sample of teachers will be asked to respond to the revised questionnaire for revalidation purposes. If the scales hold then scoring procedures can be developed.

Situation Surveys Construction

Situational variables reflect what is actually occurring in the organization, in contrast to climate variables, which reflect the meaning ascribed to the situation by individuals. James and Jones (1974) proposed these five domains of the Situation:

1. Context, the setting in which the organization develops;
2. Structure, the more enduring characteristics of an organization and their systematic relationships to each other;

Figure 4

RESEARCH-SCHOOL VALIDITY CORRELATIONS BY VARIABLE

Variable	Corr	2-tail Prob
1,2	.269	.485
3	.894	.001
4	-.006	.998
6	.641	.063
7	.582	.100
8	.635	.066
9	.549	.126
11	.691	.039
12	.869	.002
13	.680	.044
14	.632	.068
15	.195	.615
16	.847	.004
17	.725	.027

Figure 5

INTERNAL RELIABILITY BY VARIABLE

Variable	Correlation
1,2	.59
3	.77
4	.74
6	.77
7	.73
8	.84
9	.75
11	.82
12	.86
13	.91
14	.77
15	.68
16	.89

3. Process, the day-to-day behaviors in the organization;

4. Systems Norms, expectations regarding how individuals should behave in the organization; and

5. Physical Environment.

Figure 1 delineates the components of each domain. These domains could be measured at the group, subsystem or organizational level. For the purposes of our study, we developed two questionnaires, the School Situation Survey and the District Situation Survey.

In developing the surveys, we took each of the five domains and identified operational variables in school settings which could be used to describe each component within the domain. For example, to describe "Resources" within the domain of "Context," we selected the variables of per-pupil expenditures and proportions of funding from federal, state and local revenue sources.

During the process of operationalizing the variables, we differentiated between district variables and school variables; many of the variables paralleled each other in the final questionnaire. We then used these variables to devise two separate questionnaires, one for the district (44 items) and one for the school (100 items). Some of the components proved more difficult to quantify than others. For example, Decision-Making and Communication, as opposed to Size or Physical Space Characteristics. For these, descriptive responses to the items were allowed.

Use of Situation Surveys in PTI Study. The two questionnaires were used in the PTI study to document the Situation in nine elementary schools and in three districts. The primary researchers for each district and for each school were given the surveys midway into the data collection year and were asked to have them completed by the end of the last visit to the research site.

The primary source of factual data on the school level was the school principal. District level informants included an assistant superintendent for curriculum and instruction, two directors of staff development, a director of evaluation, and other administrative personnel. Most of the data in the domain of Systems Norms and some Process data were observed by the research staff and documented using ethnographic techniques.

The Situation Surveys will be used to compare and contrast situational data across schools and across districts. Plans are to use the data to provide uniform background descriptions in case studies of each school and district. While it was difficult to gain access to some data, the surveys helped researchers in avoiding misperceptions about the schools and assisted us in avoiding overlooking pertinent facts about a school. Two examples serve to illustrate the usefulness of the surveys.

> The School Situation Survey required the researcher to observe physical conditions around the school that could create environmental stresses. One school was located at a street intersection that had a four-way stop sign. The school was at the edge of an industrial trucking center; the traffic noise certainly had an effect on instruction and learning in the school building, which was set back from the street only a few yards. However, the researcher, prior to focusing on completion of the Situation Survey, had blocked the noise from his consciousness in order to conduct interviews, and had not consciously noticed the noise level.
>
> In another school, several teachers singled out the racial diversity of the student population as an important contextual factor in the school; on the other hand, the principal did not perceive the racial composition of the student body as a unique factor in the school. The Situation Survey asked for a breakdown of the racial backgrounds of the students; the data revealed that while the overall number of non-English speaking children was not significant, these children were clustered at the lower grade levels, causing an impact on the primary level teachers in particular.

Discussion

Climate is a multivariate, multi-concept area and should be viewed and treated accordingly. It is difficult and complex to define variables and to develop frameworks in this area. Many of the measures, even some of those with widespread use, do not have psychometric rigor or even psychometric information on reliability and validity available.

In addition, so called climate measures are not always related to defined variables. Thus documenting context as a backdrop for the study of principals as change facilitators has been problematic. We found the work of James and his associates to be well thought out, with psychometric rigor, and adaptable to our research needs.

We are optimistic about the potential of the School Ecology Survey to assess Psychological Climate. The approach that was developed to document the situation was also successful. With further development and trial the measures may prove to be quite useful.

Conceptualizing and then documenting the situation in the way we did was unique, instructive and allowed us to make cross district and cross school comparisons of our study variables. Completing the District Survey and the School Survey for each site provided a way to systematically collect the same basic information about each site.

We plan to continue our explorations of context and to refine the measurement procedures that we have been using. We invite others to try these techniques and to offer improvements.

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