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ABSTRACT

This study was an attempt to build upon the prior work in the area of the diffusion of innovations and innovativeness. Broadly stated, the study attempted to answer the question: What is the relationship between selected characteristics of intact groups and their innovativeness? The sample consisted of six elementary schools in Massachusetts which reported having adopted team teaching within the past two years. Staff members (130) of these schools provided information about the communication network and informal organization of their school as well as personal data. This data were related to four measures of innovativeness based on the within-group diffusion of team teaching. Findings were mixed, but in unanticipated finding indicated the vital role of the elementary principle as an agent of change. Independent research found that the most innovative school also possessed an "ideal" learning environment as perceived by its students. The techniques utilized offer a practical vehicle for initiating meaningful change within schools. (BW/Author)

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THE RELATIONSHIP BETWEEN INNOVATIVENESS

and

SELECTED ELEMENTS OF GROUP STRUCTURE

by

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ABSTRACT

THE RELATIONSHIP BETWEEN INNOVATIVENESS and SELECTED ELEMENTS OF GROUP STRUCTURE

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130 Staff members of six elementary schools provided information about the communication network and informal organization of their school as well as personal data. This data was related to four measures of innovativeness based on the within-group diffusion of team teaching.

Findings for specific hypotheses were mixed. However, unanticipated findings indicate the vital role of the elementary principal as an agent of change. Independent research found that the most innovative school also possessed an 'ideal' learning environment as perceived by its students.

As such, the techniques utilized offer a practical vehicle for improving communication and initiating meaningful change within schools.

Previous studies of the diffusion of innovations and innovativeness have suffered from two major limitations. First, most studies have focused on either the individual as an independent adopter (eg. farmers or doctors) or have considered situations in which diffusion between organizations was the locus of interest. Second, previous measures of innovativeness have generally been restricted to a consideration of how long ago the individual or organization adopted a given innovation. Relatively early (in time) adoption was considered to be indicative of innovativeness. Recognition of the above limitations led certain authors, primarily Lin (1966a, 1966b, 1968) and Rogers (1968), to explore an expanded definition of innovativeness combined with the analysis of within-group diffusion of an innovation.

The present study was an attempt to build upon their prior work in this area of inquiry by exploring the nature of various indicators of innovativeness and the relationship of selected characteristics of intact groups to the indicators. Broadly stated, the study attempted to answer the question:

> What is the relationship between selected characteristics of intact groups and their innovativeness?

The answer to this question was sought through the testing of fifteen hypotheses:

Hypothesis 1. Faculty who are younger will be more innovative.

Hypothesis 2. Faculty who have more education will be more innovative.

Hypothesis 3. Faculty who earn more will be more innovative.

Hypothesis 4. Faculty who have taught fewer years in total will be more innovative.

Hypothesis 5. Faculty who have taught more years in a given school will be more innovative.

Hypothesis 6. Faculty who perceive an innovation's advantages as outweighing its disadvantages will be more innovative.

Hypothesis 7. Faculty who perceive an innovation as benefiting their students will be more innovative.

Hypothesis 8. Faculty who perceive an innovation as being received enthusiastically by their students will be more innovative.

Hypothesis 9. Faculty who perceive that they have greater decision-making power over the adoption of an innovation will be more innovative.

Hypothesis 10. Faculty who perceive the norms in their school favoring innovators will be more innovative.

Hypothesis 11. Faculty who indicate a greater awareness of new practices will be more innovative.

Hypothesis 12. Schools which have a high degree of communication between early and late knowers will be more innovative.

Hypothesis 13. Schools which have many opinion leaders will be more innovative.

Hypothesis 14. Schools where the opinion leaders enjoy greater prestige will be more innovative.

Hypothesis 15. Schools which have fewer isolates, minor cliques, and primary and secondary liasons will be more innovative.

The sample for the study consisted of six elementary schools in Massachusetts, organized either k-5 or k-6, which reported having adopted team teaching within the past two years. All schools were members of the Network of Innovative Schools that had agreed to participate in a research study. Questionnaires were administered to the staffs of the six schools (N=130) in group meetings and the data so obtained served as the basis for the analysis.

The analysis of this research focused on the main effects of the variables specified in the hypotheses on the four measures of innovativeness--Innovativeness$_1$ (time of awareness), Innovativeness$_2$ (time of adoption), Innovativeness$_3$ (innovation internalization), and Innovativeness$_4$ (change orientation). The effect of school was included as a control variable. In those cases where the individual was the unit of analysis (Hypotheses 1-11), the answer to the question concerning the importance of the independent variables as predictors of innovativeness was sought through multiple regression analysis. In those cases where the school was the unit of analysis (Hypotheses 12-15), the answer to the question was based on logical conclusions from the data obtained.

The analyses performed in this investigation provide mixed support for the posited relationships. It is clear

that we are dealing with a very complex concept--innovativeness--one whose many facets are extremely elusive. In no case were any of the independent variables as specified in the hypotheses significantly related to all of the measures of innovativeness employed. (The number of disadvantages of team teaching cited and self-perceived opinion leadership score were significantly related to all four measures of innovativeness although they were not included as specific research hypotheses.)

The number of independent variables (or subvariables) which were significantly related to each of the four measures of innovativeness was of interest. In all, twelve were significantly related to Innovativeness$_1$ (time of awareness). These were teaching income, non-teaching income, years of teaching (total), years of teaching (in a given school), number of disadvantages, number of advantages, perceived benefit to students, perceived student attitude toward the innovation, perceived student receptivity to the innovation, perceived decision-making power, norms--attitude toward innovators, and information level regarding new practices.

Surprisingly, only three variables (or subvariables) were significantly related to Innovativeness$_2$ (time of adoption). These were years of teaching in a given school, number of disadvantages, and number of advantages.

Six variables, teaching income, years of teaching (total), number of disadvantages, perceived benefit to students, norms--

attitude toward innovators, and information level re new practices, were found to be significantly related to Innovativeness$_3$ (innovation internalization).

Innovativeness$_4$ (change orientation) had eight varaiables which were related to it. These were age, number of disadvantages, number of advantages, perceived benefit to students, perceived student attitude toward the innovation, perceived student receptivity to the innovation, perceived decision-making power, and norms--attitude toward innovators.

These findings suggest that, at least in this context, time of adoption is not a very useful indicator of innovativeness and that pursuit of the other indicators of innovativeness, especially innovation internalization and change orientation, would be far more fruitful.

Corroboration of this notion was provided by an examination of the communication network within each school. By constructing a sociogram of each teacher group and identifying certain structural characteristics, such as the number of opionion leaders, isolates, minor cliques, and primary and secondary liasons, which differentiated the schools one from another, it was possible to determine the relationship of the communication patterns and the group structure to a school's innovativeness. Hypotheses 12-15 were directed at testing these relationships.

School 4, which had ranked first on Innovativeness$_3$ (innovation internalization) and Innovativeness$_4$ (change

orientation) possessed certain structural characteristics which seemed to bolster its ranking as "the most innovative" school, according to two measures of innovativeness. School 4's two major opinion leaders, both of whom received an extremely large number of nominations, turned out to be the principal and the assistant principal! Their especially strong showing, <u>together</u>, set them apart from the other schools, which also had the principal or other administrative person as the major opinion leader. The importance of these two individuals in the advice-seeking communication network of the school is dramatically evident in the sociogram for School 4 (see Figure 4,). A possible explanation for School 4's poorer relative showing on the other two measures of innovativeness is presented in the <u>Discussion</u> section of this chapter.

The phenomena of finding the principal and other administrative staff of the schools identified as the opinion leaders has been noted in passing above. This finding seems to have such tremendous import for educational change that it bears reiteration: In all five of the schools for which data allowing this analysis was available (data from School 2 was not available), the opinion leader receiving the greatest number of nominations was either the principal, the assistant principal, or, in one case, the guidance specialist.

Additional other findings suggest that the opinion leaders as designated by their peers in the school also saw

themselves as opinion leaders. The congruence between these two perceptions was revealed by a comparison between the nominations made in response to a sociometric item and the designated opinion leaders' scores on a self-perceived opinion leadership scale. This scale, it will be recalled, was found to be significantly related to all four measures of innovativeness employed in the present study.

These findings reaffirm, but by no means make crystal clear, the multidimensionality of the concept of innovativeness. The relationships posited in the hypotheses exist, to one degree or another, depending on which facet of innovativeness is measured in a particular context. A formulation that attempts to make some sense of the foregoing is presented in the next section.

Discussion of the Findings

Knowledge of some basic principles of communication theory, learning, and attitude change coupled with the acceptance of some assumptions regarding the validity of the concepts under consideration in the present study provide the beginnings of a plausible explanation of the phenomena evidenced by the data. It is the author's contention that (1) School 4 is the most innovative, (2) that it possesses characteristics which should be emulated by other schools, and (3) that this set of findings, taken as a whole,

constitute the most significat aspect of this study in terms of future educational change efforts.

The assumptions which must be accepted are as follows. First, that the concept of a generalized change orientation, that is, a positive predisposition toward change and innovation, exists in some people and can be measured using the scale employed in this study. This concept of change orientation is not time-specific. Next, that the internalization of the importance of the use of a particular innovation to one's role performance is a viable concept, and further, that it can be measured using the scale employed here. This concept is time and situation specific. That is, an individual will vary in the extent to which he has internalized one innovation compared to another in a given situation.

Diffusion theory, as well as basic rationality, would assume that awareness (of an innovation) must preceed its adoption, at least in a theoretical sense. If the foregoing is accepted, it is reasonable to postulate a time sequence such as that depicted below:

Change orientation - Awareness - Adoption - Internalization

TIME

Obviously the process is neither linear nor isolated in

practice, but consideration of the cyclical nature of attitude formation and its interrelationship with the myriad aspects of a larger environment is beyond the scope of this discussion.

Placing these factors, identified as indicators of innovativeness, on a simplified time line gives an appreciation of the difficulty in attempting to interpret all of them simultaneously, even when the interpretation is organized around a single focus--in this case, team teaching. The interaction between the factors is likely to confound the interpretation, even though the factors may be conceptually separate.

In the present study, an additional factor may be at work as a confounding variable. In the situation under consideration, team teaching was used as the vehicle for obtaining indications of innovativeness. The vast majority of the sample population reported that the decision to adopt team teaching or not was one over which they exerted completely individual control. This state of affairs is diametrically opposite to that cited by Lin (1966b) wherein the decision to adopt flexible scheduling was one over which the teachers had virtually no influence. In that context, Lin found time of adoption to be a meaningless variable. The same may be true in the present study, but for entirely opposite reasons. Indeed, this may explain the fact that of the independent variables investigated, only three were

found to be significantly related to Innovativeness$_2$ (time of adoption). On this basis, it can be concluded that the meaningfulness of time of adoption is vitiated in this context, and the fact that School 4 ranks third on that measure of innovativeness is of little import. But what about time of awareness, a measure of innovativeness on which School 4 ranked fourth?

A ready explanation is available for these results as well. Team teaching was first introduced almost fifteen years prior to the present data collection effort. Further, its introduction occurred in a school in Massachusetts. It is reasonable to conclude then, that teachers who were (1) older and (2) had been in the profession longer would be far more likely to have heard of team teaching, even if they hadn't adopted it, than younger teachers who only recently entered teaching. An examination of these factors for teachers in School 1, ranked first on Innovativeness$_1$ (time of awareness), revealed that they were indeed older (57% were over 40) and had been teaching longer (60% over 11 years) than the teachers in School 4, 45% of whom were under 30 years of age and 63% of whom had taught less than 6 years. Certainly these factors had more than a little effect on the schools' relative rank on awareness of the innovation.

The above discussion has been directed at supporting the contention that the two attitudinal indicators of innovativeness--Innovativeness$_3$ (innovation internalization) and Innovativeness$_4$ (change orientation) were, in this context, the most meaningful criteria for determining which school was the "most" innovative, and that by applying these criteria, School 4 was indeed number one. The fact that School 4's major opinion leaders were the principal and assistant principal, chosen from a rather cohesive communications network, seemed, subjectively of course, to be an additional positive factor. Of course a basic assumption underlying everything that has been said thus far is that innovativeness is "good", and that team teaching is a desireable practice to employ. One could speculate that School 4 is a fluke--that its relatively young and inexperienced staff are being "hoodwinked" by a powerful and influential principal-assistant principal team into thinking team teaching is nothing short of fantastic. This alternate explanation cannot be discounted directly in the case of Innovativeness$_4$ (change orientation). However, we know that specific experiences (eg. the adoption, use and internalization of team teaching) become generalized as part of an individuals' general response set (cf. change orientation). Thus if we can negate the appeal of the alternate explanation in the case of Innovativeness$_3$ (innovation internali-

zation), which is situation specific, perhaps we can generalize to change orientation as well. As it happens, data is available which does just that.

If the situation in School 4 was uniquely rosy, (or for that matter was not but was reported to be), and/or if the staff had been sold a bill of goods by the administration, two things might occur. First, a sizeable number of the staff would not have adopted team teaching, since it was a decision essentially in their individual control. Second, their report of the advantages of team teaching would heavily outweigh the reported disadvantages. A reinspection of the relevant data indicates that neither is the case.

Regarding adoption of team teaching, less than 10% of the teachers report non-adoption. In fact, School 4 leads all the schools on percentage adopting team teaching (see Figure 1, for the complete data). Well, one might say, they surely must think it is great. And indeed they do. School 4 teachers report an unmatched 79 advantages, more than twice as many as the next highest school. However, School 4 teachers also report the greatest number of disadvantages--41. What does this mean?

Despite conventional wisdom and the preponderance of educational practice, it is a well-researched fact that an individual is more likely to retain an initial decision if he has considered both the positive and negative aspects of

it prior to drawing a conclusion. Such seems to be the case here, where it seems that both the pros and the cons of team teaching have been thoroughly considered by the teachers in School 4. Of particular interest is the fact that the ratio of the total number of mentions for both advantages and disadvantages to the number of staff is almost 4:1. This would seem to indicate a depth of understanding which, when coupled with the high percentage of adoption, would seem to offer a plausible explanation for the number one ranking on Innovativeness$_3$ (innovation internalization) attained by School 4.

Independent corroboration of the author's position that School 4 is the outstanding school was offered by findings cited in McKay's (1971) study of elementary school environments and organizational climates. Based on previous research, that study postulated several parameters of an ideal educational environment as seen by a school's students. Of the thirty-six schools included in the population sample, McKay identified two schools which met the requisite criteria for an ideal environment. School 4 of the present study is one of these two schools. Further, the study compared the teacher-principal interaction as measured by the Organizational Climate Description Questionnaire and found high congruence among the two schools, indicating that perhaps there is a "most desireable" range for these

factors as well. Thus, it was concluded that ideal educational environments and certain teacher-principal interactions go hand in hand. It is reasonable to conclude that data examined in the present study present certain aspects of this "desireable" teacher-principal interaction. The most obvious of these is the high regard teachers have for the principal as a source of helpful advice. He, along with the assistant principal, is at the center of a rather cohesive communication network. It is clear that he is intimately involved in all of the activities of the school, and that this involvement is not viewed as obtrusive by the teachers. A further indication of this positive teacher-principal interaction is the relatively high prestige he enjoys within the group. Intuitively, it would appear that these factors have a substantial effect on the learning environment in the school. The implications of the findings and recommendations for future research are explored in the following subsections. (The reader is referred to Appendix C for the relevant excerpts from the McKay (1971) study. School 4 is the same in both cases.)

Implications for Action

The findings in this study must be viewed in light of how they might affect future educational change efforts, in these six schools as well as in schools in general. One implication of the finding that the perceived benefit to students, as well as their attitude and receptivity to an innovation, in this case, team teaching, was related to the change orientation and the time of awareness of the teachers is that individuals introducing new practices into schools should strive to demonstrate the innovation's potential appeal and benefit to the students. Linked to this was the complementary finding that the number of advantages and disadvantages perceived was related to these same two indicators of innovativeness. It will be recalled that the simple time sequence presented in the previous section postulated a sequence starting with change orientation and proceeding through time of awareness, adoption and finally, internalization. It is interesting to note that the number of advantages and disadvantages was also related to time of adoption. Despite the questionable meaningfulness of this innovativeness indicator in this study, adoption (of an innovation) most certainly must occur (or not occur) in a given setting. The most important aspect of this action is its effect on the innovation's eventual fate. Simple

adoption, or compliance, is not likely to be sufficient assurance that a given innovation will even survive, let alone thrive. Something more is called for. That something has been postulated to be innovation internalization.

To the extent that the use of a given innovation has been internalized, it is likely that the adoption is a functional one, rather than simply a ceremonial one. The importance of such functional adoption of an innovation to the success of any planned change effort is obvious. Hence, the finding that perceived benefit to students and number of disadvantages were also significantly related to internalization serves to emphasize their inclusion as key variables. The reality perspective from which it can be assumed these variables derive would imply that while advantages are necessary elements prior to adoption, it is the forthright balancing of these with disadvantages which results in the ultimate acceptance and use of an innovation. Similarly, although perceived enthusiastic student attitude is necessary to encourage initial adoption, it is not likely to be enough to sustain it without some evidence of more tangible student benefit.

The inclusion of information level re new practices as a variable significantly related to both time of awareness and internalization would seem to reaffirm the widely held view that a continued influx of new information must be

sustained in order for innovativeness to be nurtured.

The pervasive importance of group norms, measured by the attitude toward innovators, suggests that attention must be paid to those tangible and intangible cues in a school which seem to favor innovation. Thus, a school might profitably explore some sort of reward structure which would go far toward establishing progressive norms within the school. Despite the fact that teaching income and years of teaching were significantly related to innovation internalization, they do not seem likely vehicles for this type of reward system. It seems likely that their relation here is due to the security level reached by those teachers employed longer and earning more money. These basic needs, once filled, would seem to provide the safe corner from which to venture forth and innovate. It is doubtful that the relationship is linear in any case, and we have no simple way to determine the point after which diminishing returns result. As has been noted previously, even if we did know the answer to the foregoing question, we couldn't do anything about it - teachers are tenured, and as each year ticks by, they get more money, all other things being equal.

The implications put forward thus far either relate to the need for a communication vehicle or are the result of one. So it is easy to see the potential importance of

having a "road map" of the group prior to attempting to introduce a change. Certain features of a communication network, such as those depicted in Figures 2-6 determine how costly any communication is likely to be. An examination of the implications of the network in each school for any future action in that school should make these generalizations more concrete.

Any attempt to introduce an innovation into School 1 should not only attend to the opinion leaders as prime targets for persuasion efforts but should not fail to take into account that the absence of teachers 5 and 20 would cut off a significant portion of the faculty from input. In general the structure is overly reliant on one-way links, and over thirty percent of the staff have only one source for their advice. Steps should be taken to bring the teachers as a group into more situations where sharing would be likely to occur. Perhaps a special time needs to be put aside each week solely for this purpose. There is no a priori reason that "show and tell" should be restricted to second graders.

School 2, as has been noted before, is an unknown quantity in this regard. Certainly the unusual reluctance of the teachers to cooperate with the researcher sets this school apart from the others in the study. It would be unfair to speculate any further about possible contributing

factors, but it is obvious that a severe problem exists which the responsible administrators should attend to.

School 3 has perhaps the most potentially costly structure of all the schools. Teachers 10, 11, and 21 are completely isolated. Teachers 15 and 28 form a two member clique with no connection to the main group. Even more dangerous, teacher 20 is the sole link with the major clique for almost half of the remaining teachers. Teacher 19 and/or 13, if absent, cut that secondary group in two. These factors would indicate that a good number of the teachers have little or no idea what their colleagues are doing. Certainly there is a practical limit to how much information teacher 20 can carry from one group to the other. School 3's rank at or near the bottom on all indicators of innovativeness would seem to lend support to the notion that the potentially costly communication network would be unlikely to foster innovation. The low prestige enjoyed by the opinion leaders is another bad sign. The responsible people should move to bring in the isolated members and plan a strategy to produce more linkage between the two large subgroups. Perhaps teacher 26 could be approached to consider making overtures to the primary liasons - teachers 13, 19, and 20 as a first step toward building a cohesive group. It will be recalled that this individual(26) is the assistant principal, so his mobility within the group is certainly not

an inhibiting factor. Although the above are not as obvious danger signs as in School 2, the potential impact of this borderline situation on the long-term success or failure of the school to maximize its effectiveness is every bit as evident.

Perhaps enough has been said already about School 4. Though not the most cohesive of the schools, it seems to possess some features which have worked together to generate an innovative school. Not only does it have more than one opinion leader, but all of the opinion leaders enjoy relatively high prestige. The absence of either the one primary liason (teacher 8) or the two secondary liasons (teachers 6 and 31) would cut off less than ten percent of the teachers. The identity of one of the isolates is unknown, but the other is not a regular teacher. Nonetheless, it would seem desireable to integrate them into the group. Good things are happening in School 4 which should be shared with other schools. How did the principal(30) and the assistant principal(33) come to be so highly regarded by their staff? Are there features to the situation which are unique to this school and cannot be generalized? Questions like these need to be asked, for the answers might go a long way toward helping other schools move closer to being innovative.

School 5 is indeed unique among this group of schools.

As the only parochial school included it seems likely to possess underlying characteristics that interact with its desireable communication network. The number and prestige level of the opinion leaders is phenomenol. That these facts alone do not result in automatic innovativeness is apparent from an inspection of the school's showing on the measures of innovativeness. Although ranked second on change orientation, School 2 was fourth on innovation internalization. It may be that time is interacting with the other factors to suppress the internalization score (it will be recalled that School 5 was the latest knower and the latest adopter among the six schools). Without an extension of the analysis, it can only be speculation.

School 6 also seems to have some potential warning signs. It suffers from a large number of isolates (teachers 6, 8, and 15) for its size. Six of its teachers have only single advice links. The absence of teacher 16 would isolate teacher 22 as well as the three-member clique. Lastly the fact that teacher 18 is the only opinion leader must be viewed as a weakness. Despite the fact that this person(18) is the principal, he is still the only opinion leader designated. His prestige is not significantly high either. And although School 6 heard about and adopted team teaching rather early, the teachers have not internalized its use to any great extent. An examination of why this last is

true, coupled with a systematic plan to develop other opinion leaders among the teachers would seem a fruitful venture. One person cannot make the world go round, at least not for long. Efforts to involve the staff in a sharing of their concerns about team teaching and a working through of these concerns seems indicated.

A generalization that seems appropriate to all the schools is that the role of the principal in the elementary school needs to be carefully examined. Based on these findings, those situations which exhibit a high congruence between the leaders of the formal organization , as denoted by their job titles, and the leaders of the informal organizations, as designated by the organization's members, seem most likely to be encouraging to innovation. Witness School 4. We need to look more closely at the factors which lead to this desireable condition and incorporate them in programs directed at preparing elementary principals to be more effective leaders and managers of change. Elementary schools seem to present a situation where the notion of a principal whose primary concern is administration is contrary to conditions which foster innovation. Programs to address these needs are obviously needed. What they should include is only somewhat known. Some steps have been noted above. Recommendations for future research which might provide additional information for action are included in the next section.

Recommendations for Future Research

Research designed to extend the findings of the present study should attempt to answer several related questions which have arisen from the analysis of the current data. One group of questions deals with innovation internalization. What is the interaction between time and innovation internalization? Do characteristics of the innovation affect its internalization one way or the other? What methods of innovation introduction and demonstration are most effective in speeding its internalization?

Questions regarding change orientation are also present. Is the measure employed in fact reliable over time and unaffected by the particular innovation under consideration? What is the relationship of change orientation to other psychological characteristics of the respondents? Of what use might such information regarding their change orientation be in selecting teachers? What is the relationship of change orientation to success as a teacher in school X?

Regarding innovativeness in general. What is the relationship between innovativeness of a teaching staff and the environment of the school as seen by the students? A hint that the two are related is provided by the McKay findings cited in the previous section. Future research might uncover previously unanticipated relationships between the informal

organization of a school and its effect on the children's view of the learning environment around them. What is the relationship between innovativeness and student achievement? Perhaps innovativeness isn't really important in helping students to learn.

Regarding the communications network. What is the effect of one of the strategies suggested earlier on the communication network and on the innovativeness of the staff of a given school? Is there an ideal mix of structural characteristics that facilitates innovation? The findings here suggest that a cohesive group is not the panacea by itself, but it must have some additional features in order to be most effective as a vehicle for innovation. Are these same factors important for organizational structures other than elementary schools?

The role of the principal is apparently a central one in the elementary schools studied. Is this true in other settings as well? Perhaps we need to differentiate between elementary schools and high schools in our inservice training programs for principals, for example. What factors result in the assistant principal being the prime opinion leader in certain schools? Is there a dominant leadership style in these schools that accounts for the central position of principals and others? Most current training programs

for school administrators put little emphasis on the skills required to become a respected source of advice. What are the characteristics of an innovative principal? What are the effects on children of an innovative or non innovative principal? Are there different effects in elementary schools, as studied here, and high schools? Perhaps what is most needed is additional specification about what kinds of activities such an opinion leader engages in, what his methods of communication are, how he relates to his peers, etc. It may be that a new role needs to be defined. Once defined, how could we best train these "internal" change agents to function in these new roles? What would be the structure of the organization after the entry of such an agent? The questions are myriad, the possibilities exciting.

The answers to these questions could provide even more positive direction for institutions and individuals interested in improving education. When we have a surer grasp on the critical variables that affect the innovativeness of our schools, we will be much closer to finding vehicles to meet the pressing needs of our children. Elements of educational organizations that can be effectively manipulated to meet these needs must be sought out and utilized. This study has hopefully been one small step in that direction.

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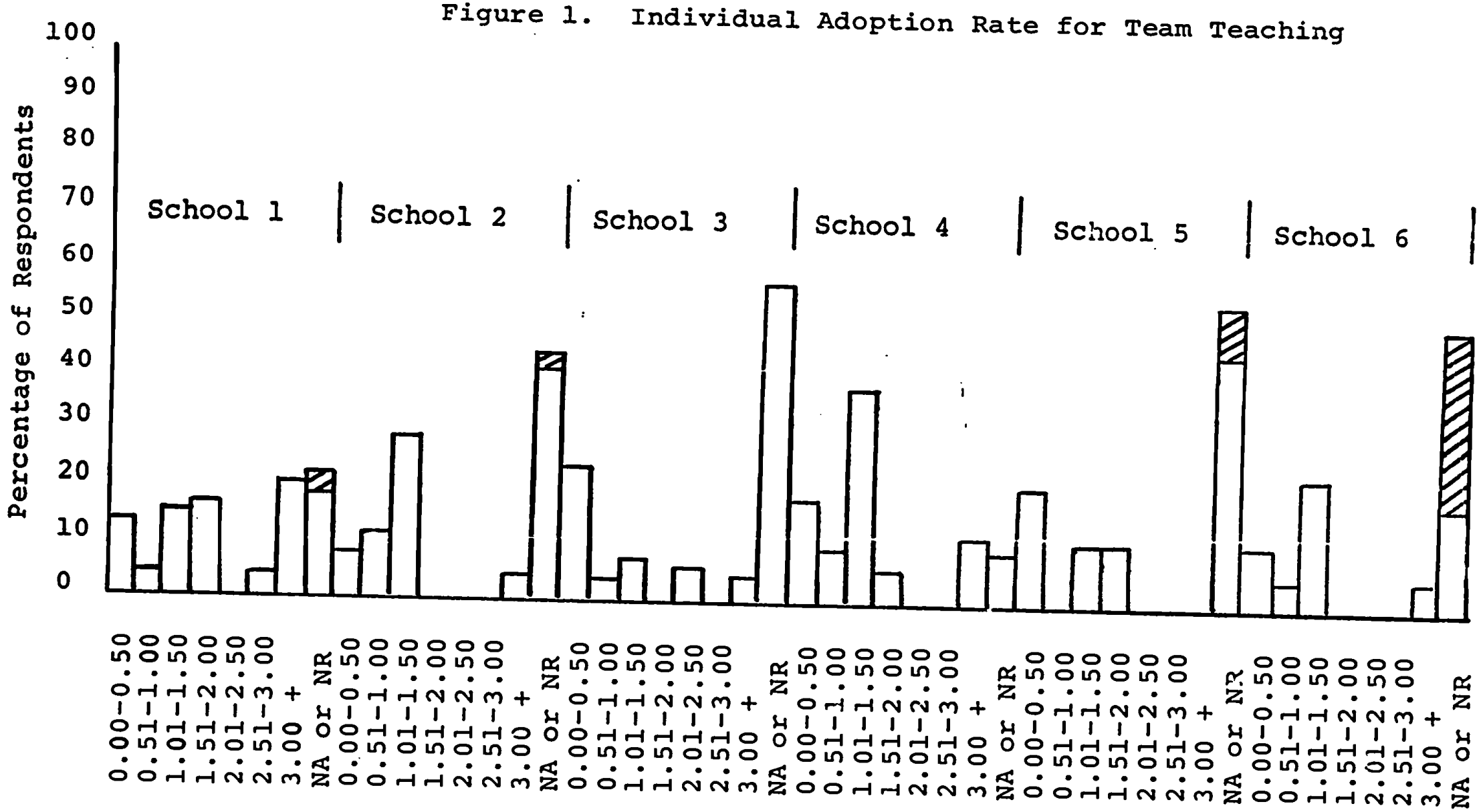
APPENDICES

Figure 1. Individual Adoption Rate for Team Teaching



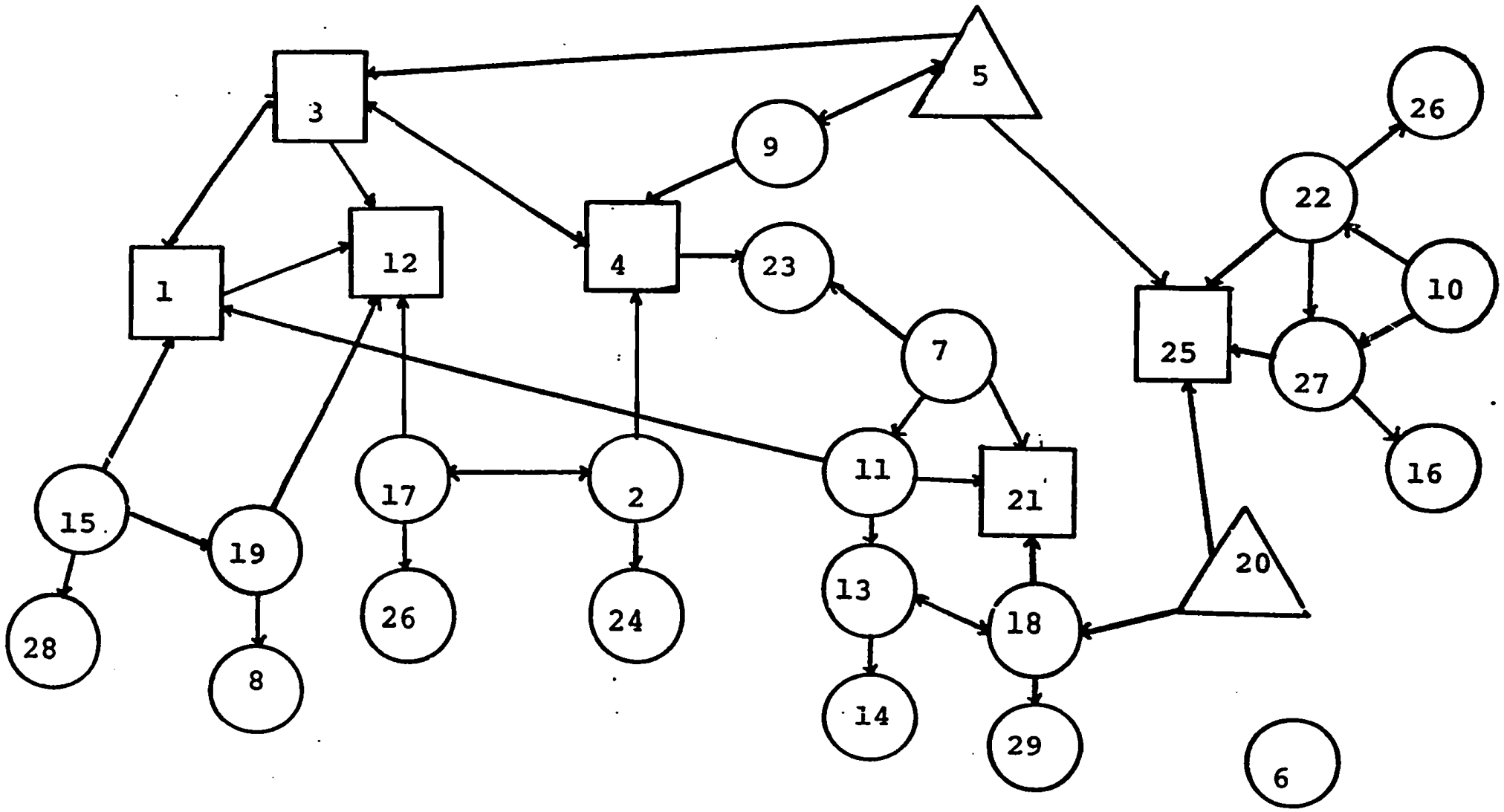


Figure 2. Sociogram of (advice-seeking) communication network for teachers in School 1.

KEY: Opinion Leader; Primary Liason; Secondary Liason; Teacher X

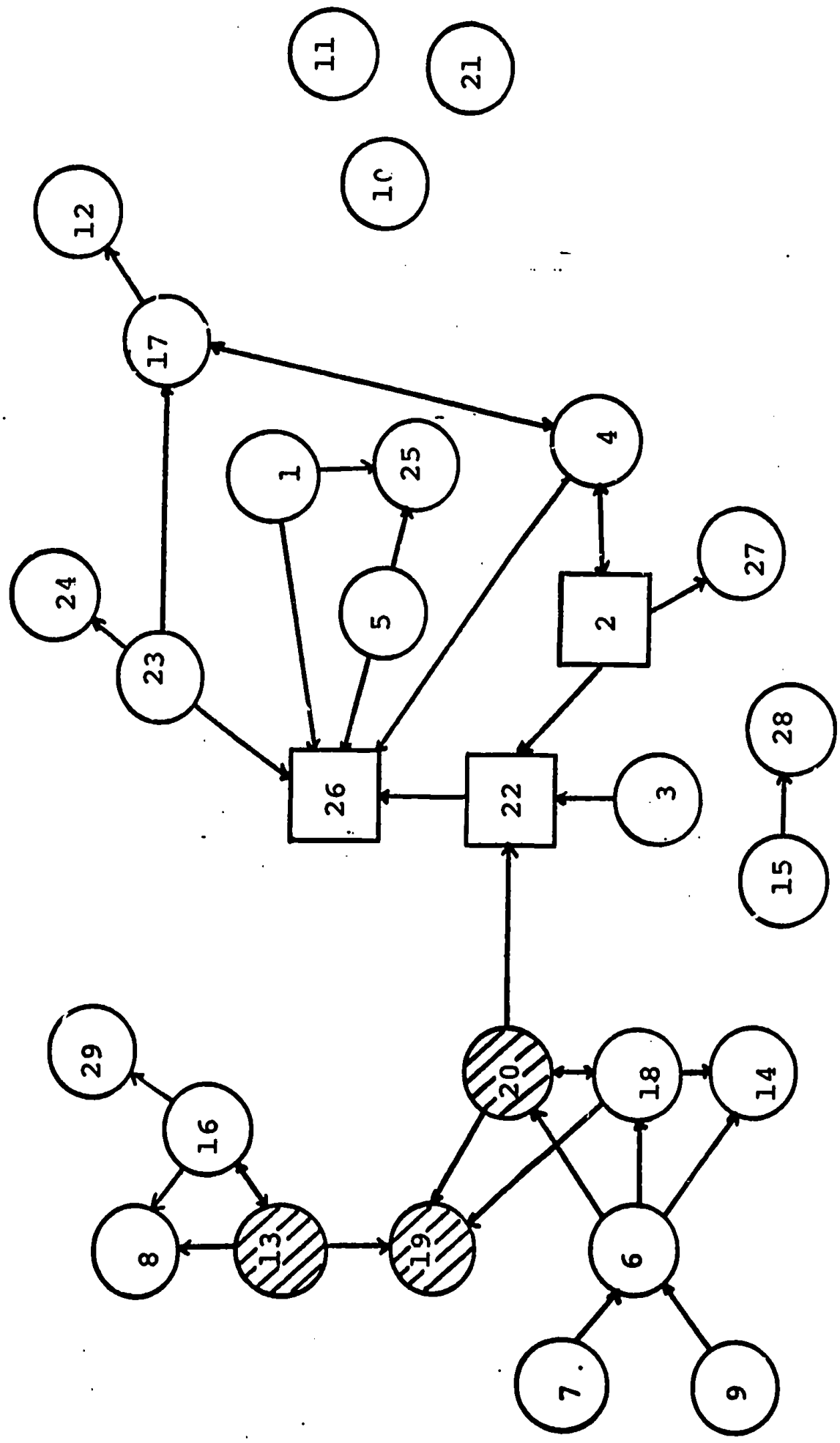


Figure 3. Sociogram of (advice-seeking) communication network for teachers in School 3. (see Figure 2 for key to symbols)

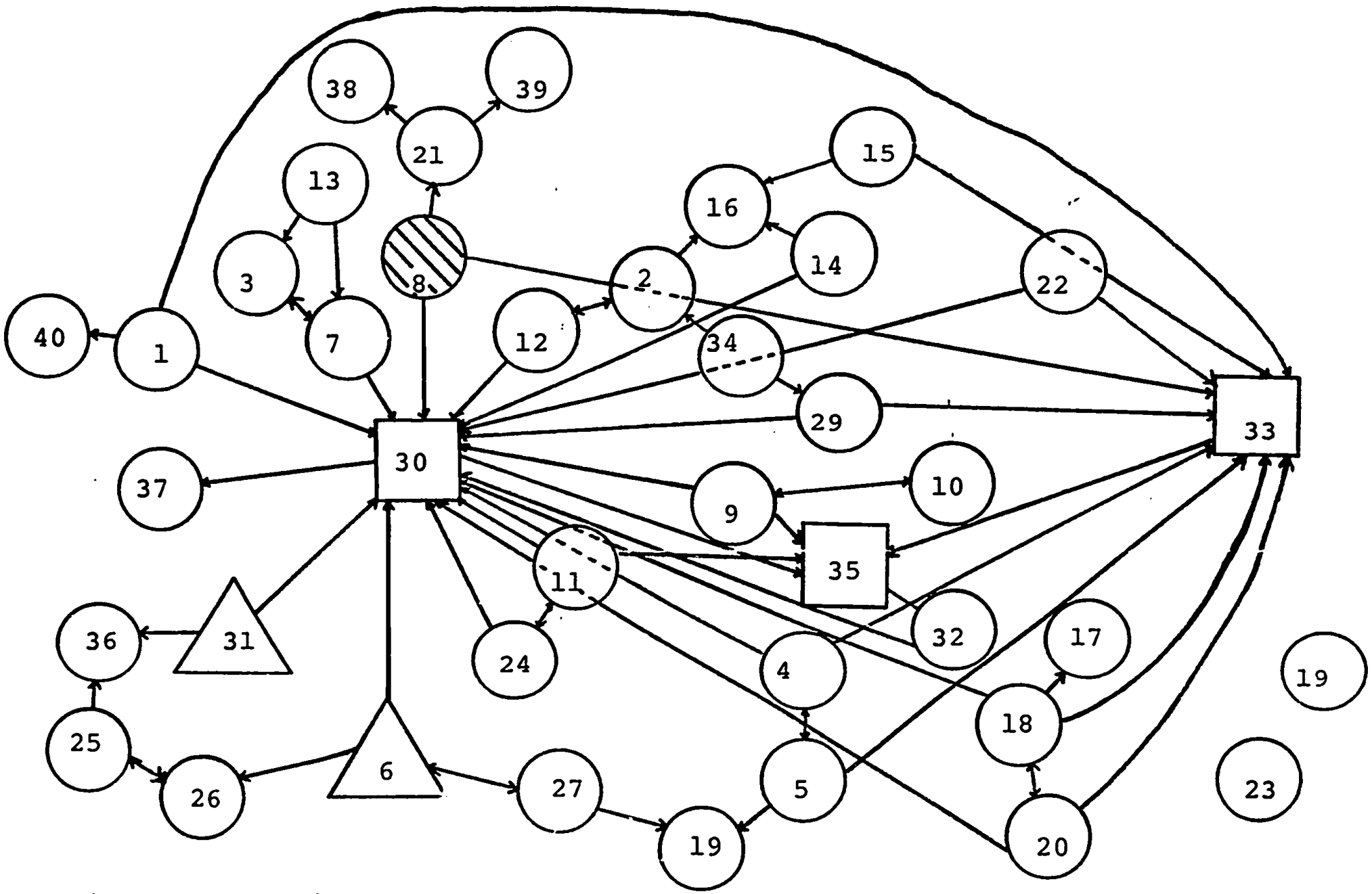


Figure 4. Sociogram of (advice-seeking) communication network for teachers in School 4. (see Figure 2 for key to symbols)

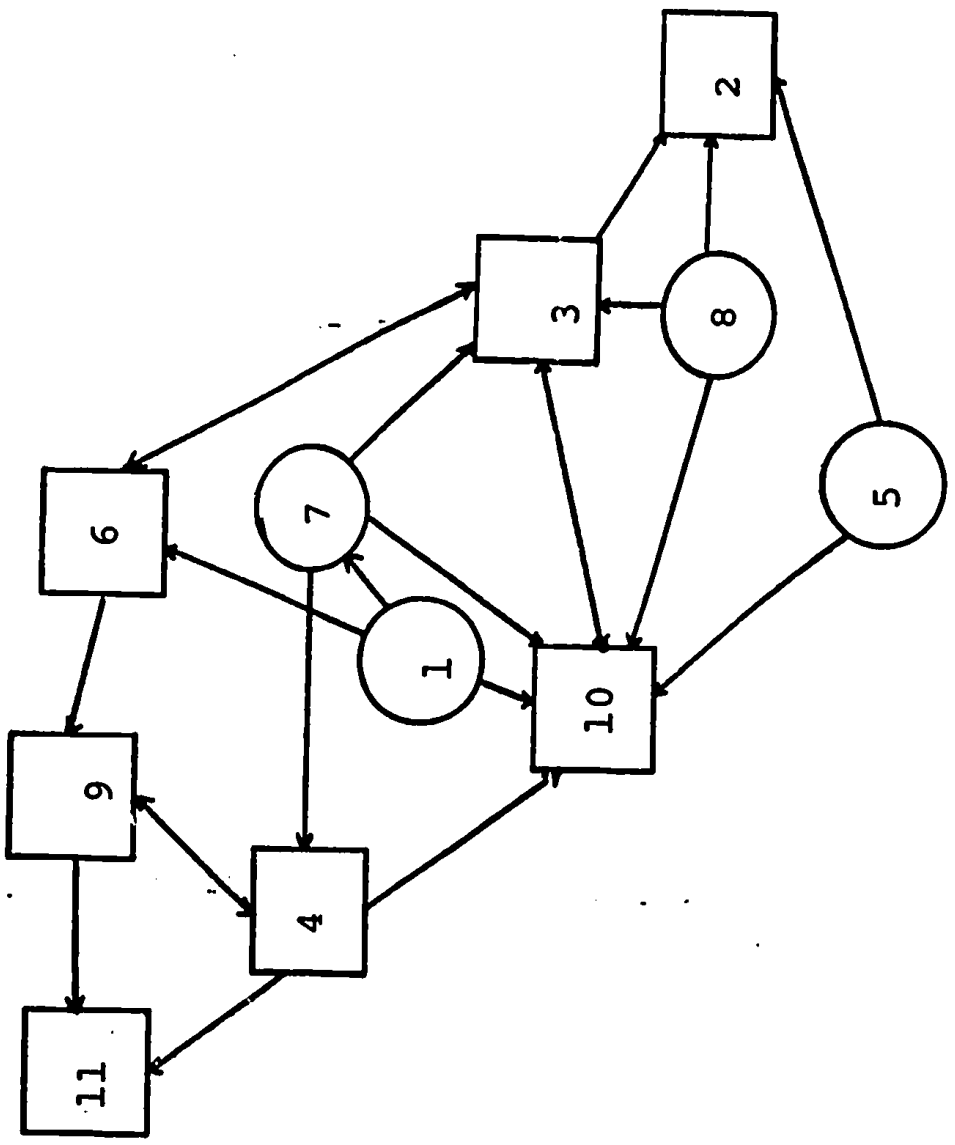


Figure 5. Sociogram of (advice-seeking) communication network for teachers in School 5. (see Figure 2 for key to symbols)

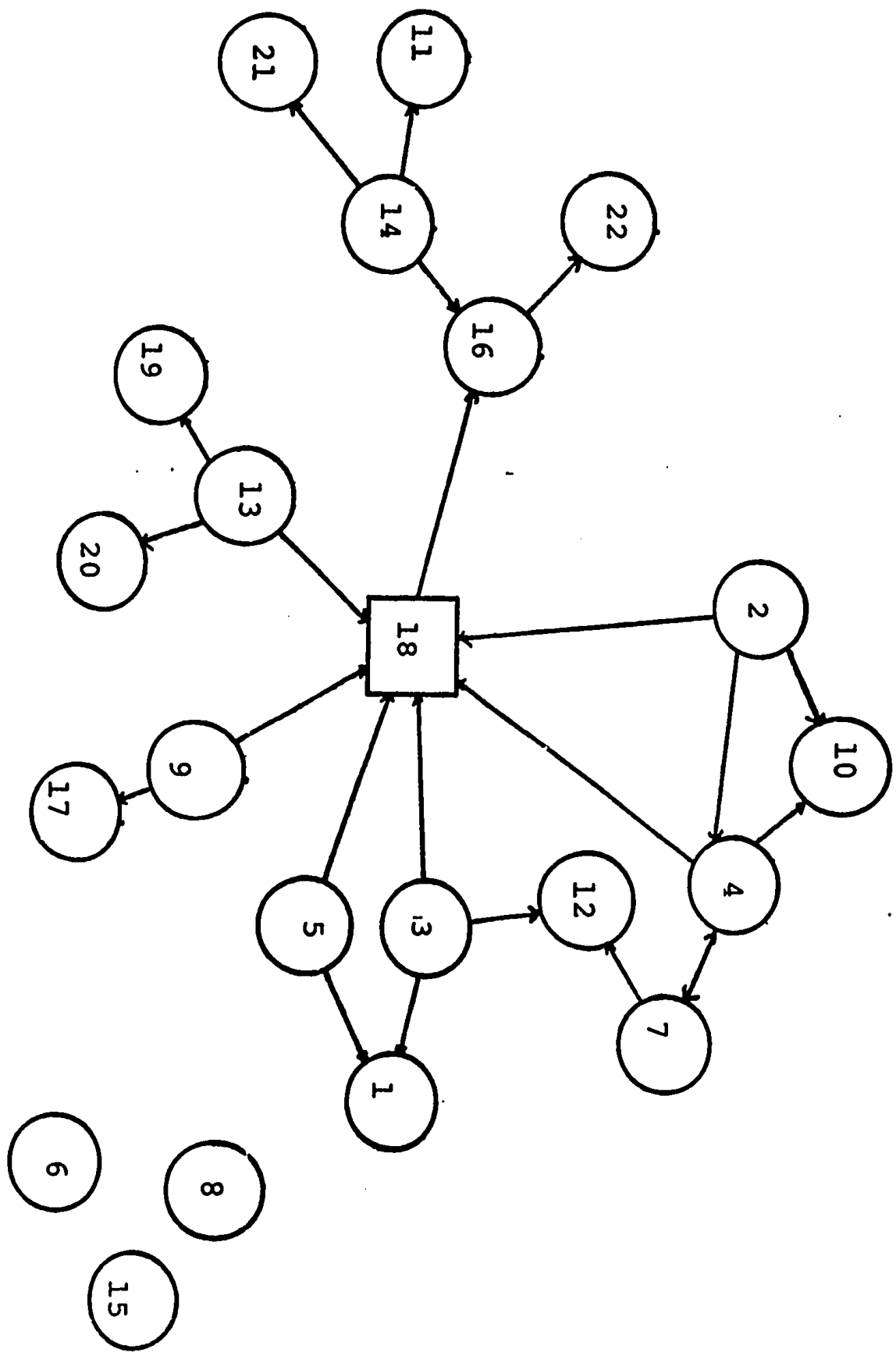


Figure 6. Sociogram of (advice-seeking) communication network for teachers in School 6. (see Figure 2 for key to symbols)

APPENDIX B

SUMMARY OF RESULTS OF TESTING HYPOTHESES 1 - 11

	Independent variable	Dependent variable I_1*	I_2*	I_3*	I_4*
H1.	Age	NS	NS	NS	< .05
H2.	Education	NS	NS	NS	NS
H3A.	Teaching income	< .01	NS	< .01	NS
H3B.	Non-teaching income	< .01	NS	NS	NS
H4.	Years of teaching (total)	< .01	NS	< .01	NS
H5.	Years of teaching (in a given school)	< .05	< .05	NS	NS
H6A.	Number of disadvantages	< .01	< .01	< .01	< .01
H6B.	Number of advantages	< .01	< .01	NS	< .05
H7.	Perceived benefit to students	< .01	NS	< .05	< .05
H8.	Perceived student attitude toward the innovation	< .01	NS	NS	< .01
H9.	Perceived decision-making power	< .01	NS	NS	< .01
H10.	Norms-attitude toward innovators	< .01	NS	< .01	< .01
H11.	Information level re new practices	< .05	NS	< .05	NS

* I_1 = Innovativeness$_1$ (time of awareness); I_2 = Innovativeness$_2$ (time of adoption); I_3 = Innovativeness$_3$ (innovation internalization); I_4 = Innovativeness$_4$ (change orientation)

APPENDIX C

To evolve a hypothetical ideal climate requires consideration of the needs and motivations of those working and learning within the school. A desirable educational environment would be one which would be likely to foster the growth and development of its' students. The environment postulated below represents a desirable direction toward which elementary schools should strive.

Before defining the ideal environment, criteria were established for such terms as high, moderate, or low scores. Given these criteria, summarized in Table 21, an ideal educational environment was postulated as follows.

Alienation -- A low score is desirable on this variable. It is important that students feel involved in school affairs, and that school norms are internalized in their academic and other pursuits. Students must feel the sense of belonging and the accompanying concern for students that is characteristic of schools possessing a low alienation score.

Humanism -- It is crucial that school environments possess a high score on this factor. Reflective of a concern for the integrity and value of the individual, schools must support and inspire creativity in the personal acts of individual student expressions characterized by this atmosphere.

Autonomy -- A moderately high or high score is desirable for this variable. It is important that educational environments support and encourage student independence, and that students are afforded the opportunity to share in the responsibility for their

own learning. It is likewise crucial that sufficient opportunities exist for maturity to be developed through sufficient interaction with teachers and other adults.

Morale -- Representative of a friendly and cheerful school atmosphere, this environment has been described as a happy one in which learners and teachers have a warm relationship. Students should possess a positive attitude toward school, and practice the cooperating behavior associated with such an attitude. Also, it is important that good relationships exist between students and teachers. For these reasons, a high score is desirable on this factor.

Opportunism -- Moderately low or low scores are desired on this variable. Schools must not encourage pupil behavior which adapts to expediency or circumstance. Nor should one gain social or academic success by "knowing how to behave" with important or influential people. We badly need schools which foster honesty and straightforward behavior, unclouded by the entrepeneurial activity and political maneuvering characteristic of higher scores on this factor.

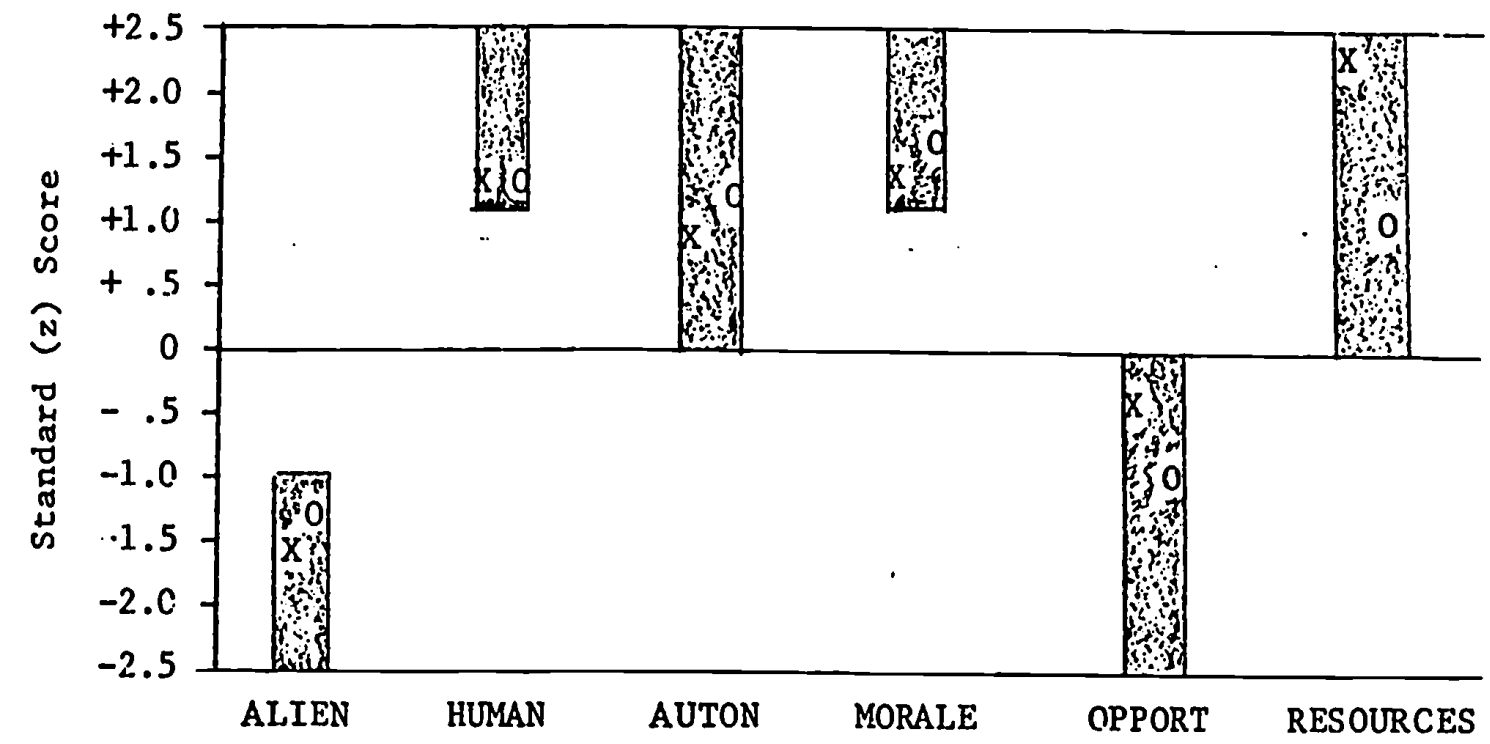
Resources -- A desirable score for this variable is one which is moderately high or high. It is important that schools offer a variety of learning resources to their students, including the availability and friendliness of the teachers. These resources should, however, be derived from clearly examined goals and instructional purposes. While it is important that schools offer

a variety of these learning resources, both human and material, the quality of the educational environment is not necessarily predicated upon such a single factor.

When the scores of the thirty-six schools in the sample were examined, two were found to conform to the requirements of an ideal educational environment. Schools 004 and 100 met the established criteria. The environment scores for these two schools are displayed in Figure 5, which also depicts the desirable range of scores for each educational environment factor.

Figure 5

Variable Scores for Two Schools
Possessing an Ideal Educational Environment



Educational Environment Variable

Legend: ▒ - Range of scores for ideal environment
X - Scores for School 004
0 - Scores for School 100

Table 21

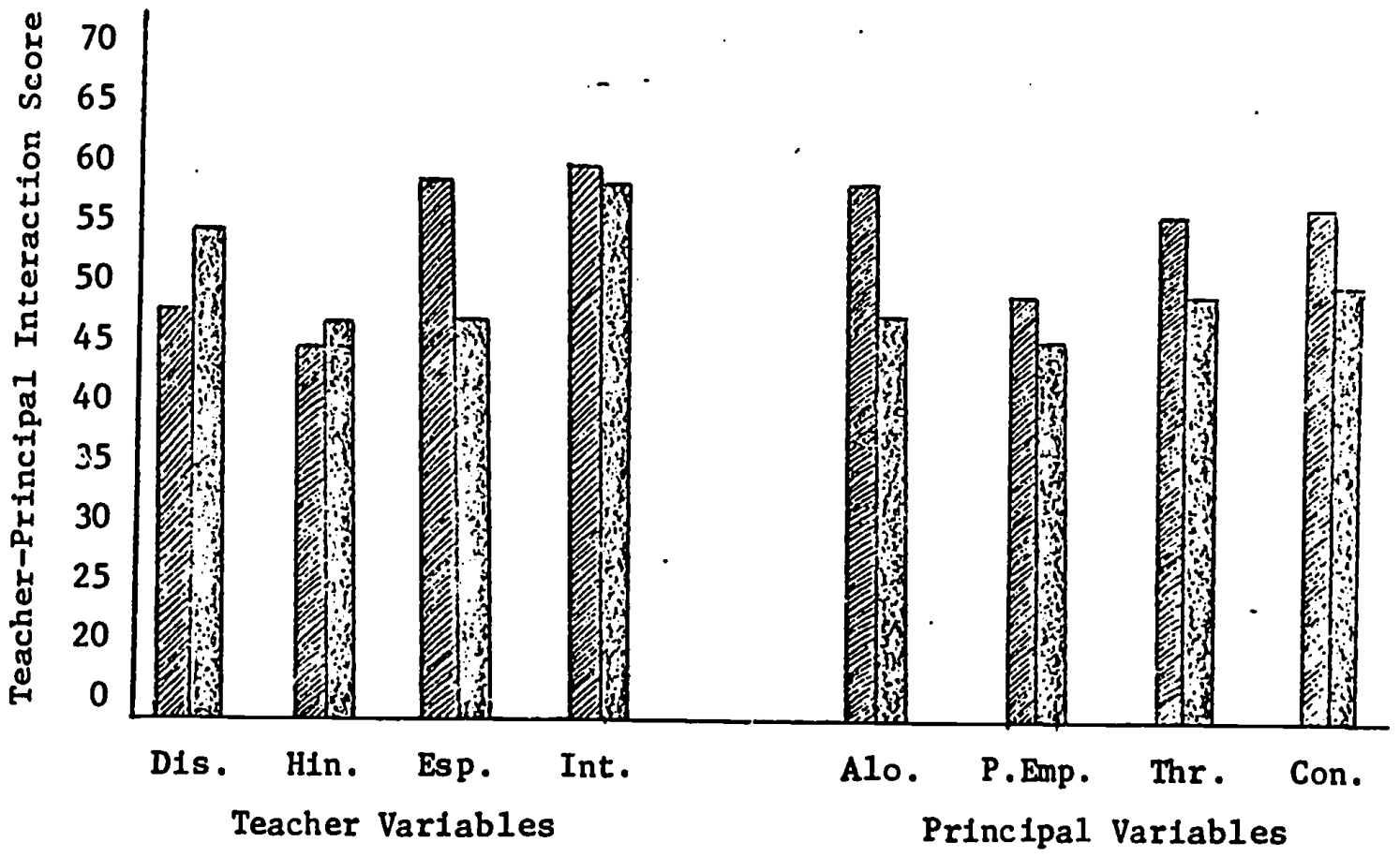
Criteria for Terms Used to Describe
An Ideal Educational Environment

Term	Range of Standard (z) Scores	Range of Variable Scores					
		ALIEN	HUMAN	AUTON	MORALE	OPPORT	RESOURCES
High Score: Greater than	+1	38.8	57.0	62.2	59.1	48.8	74.6
Moderately High Score: Greater than	0	32.5	51.4	53.5	51.4	45.8	67.1
Moderate Score: Between	-1 to +1	26.2-38.8	45.8-57.0	44.8-62.2	43.7-59.1	42.8-48.8	59.6-74.6
Moderately Low Score: Less than	0	32.5	51.4	53.5	51.4	45.8	67.1
Low Score: Less than	-1	26.2	45.8	44.8	43.7	42.8	59.6

The teacher-principal interaction in the two schools was then compared by placing their individual variable scores on a single graph. This profile is displayed in Figure 6.

Figure 6

Comparison of Teacher-Principal Interaction in Two Schools Possessing an Ideal Educational Environment



The similarity of the principal and teacher scores for these two schools is striking. Close inspection of Figure 6 reveals that for five of the eight teacher-principal variables, less than one standard deviation separates the scores of the schools. These similarities add visual support for the contention that a relationship exists between desirable educational environments and selected components of teacher-principal interaction.

The data collection for this study was conducted and supported by the Network of Innovative Schools. The Network is a linking organization servicing a voluntary federation of almost one hundred Massachusetts public, private and parochial schools (K-12), dedicated to improving education through innovation and to working collaboratively toward organizational self-renewal.

Inquiries related to this study or to the activities of the Network are welcomed and should be addressed to:

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