DOCUMENT RESUME

ED 206 109 EA 013 911

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TITLE Implementing Innovations in Schools: A Concerns-Based Approach.
PUB DATE 12 Apr 79
NOTE 31p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 8-12, 1979).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Administrator Role; *Change Strategies; *Curriculum Development; *Educational Innovation; Elementary Education; Elementary School Science; Inservice Teacher Education; *Intervention; Linking Agents; Models; Principals; *Program Implementation; Teacher Improvement
IDENTIFIERS *Concerns Based Adoption Model; Levels of Use of the Innovation

ABSTRACT

The Concerns-Based Adoption Model (CBAM) has been designed to describe change as it affects individuals and to prompt more successful change efforts. CBAM views the teacher as the focal point in school improvement efforts, yet also acknowledges social and organizational influences. This paper describes the application of the model to a curriculum implementation effort in revising the science curriculum in grades three to six in the 80 elementary schools of Jefferson County (Colorado). The design for curriculum implementation was based on an understanding of teachers' concerns and how they change over time. Two CBAM measures of teacher change were used: Stages of Concern About the Innovation and Levels of Use of the Innovation. These measures and their application to a representative sample of teachers are explained. Some of the study's results have direct implications for facilitators of change efforts. First, that the actions taken by building principals to support or inhibit a change effort have direct effect on how teachers feel about and ultimately use a new program. Secondly, implementing an innovation takes more than one year. Change facilitators and policymakers should set realistic expectations for themselves, teachers, administrators, and evaluators. (Author/MLF)

IMPLEMENTING INNOVATIONS IN SCHOOLS:

A CONCERNS-BASED APPROACH

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Paper presented at the annual meeting of the
American Educational Research Association
San Francisco, April 12, 1979, Session 33.12

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Over the past twenty years, millions of dollars have been spent both in large and small-scale efforts to promote improvement in schools. Innovation development, dissemination and implementation activities have received attention and funding from federal, state and district levels, and from private foundations. The result has been much flurry, but study after study indicates that there has been relatively little change "behind the classroom door," particularly in terms of the investment that has been made (Berman & McLaughlin, 1975; Charters & Jones, 1973; Goodlad & Associates, 1971· Schiffer, 1978). Why have change efforts been so ineffective? What must be done to facilitate worthwhile, successful change in schools?

Fortunately responses to these questions are becoming more and more numerous, at least at the conceptual level. Reflecting on the last two decades of "innovation," Schiffer (1978) notes that

> Although hopes for school renewal often centered on aspects of schooling other than teacher training, such as improvements in curriculum, materials, and programs, it soon became apparent that teachers were the bottom line in any change that might take place. If teachers were unwilling or unable to implement an innovation, even the most "teacher proof" package was doomed to failure (p. 4).

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[1]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.

Teachers are key to any school improvement effort. A multitude of strategies which focus on their individual needs have been developed in recent years. Teachers' centers, receiving increasing attention and funding, and individualized staff development activities are examples of this trend (Amory, Zigarmi & Zigarmi, 1979; Feiman, 1978, Swenson, 1978; Zigarmi, 1978). Yet teachers are part of a variety of social systems--schools, school districts and society in gereral--each of which have goals and expectations. How can staff development focus on teachers' individualities and needs, without losing sight of the goals of the system as a whole? Few models have been found which provide responses to this dilemma (Miller & Wolf, 1978).

Over the past six years, research at the Texas R&D Center has focused on developing one such model. The Concerns-Based Adoption Model, or CBAM (Hall, Wallace, & Dossett, 1973) views the teacher as the focal point in school improvement efforts, yet acknowledges and attends to the social and organizational influences as well. Developed initially to conceptualize teachers' needs and uses of different change programs, the model has recently been applied to planning and monitoring implementation efforts in several schools, school districts, and university settings. This paper describes the application of the CBAM to the design of a curriculum implementation effort in a large school district. It then presents the results of a study undertaken to determine the effects of the effort on the concerns of the teachers and on their use of the new curriculum.

The Concerns-Based Adoption Model

The CBAM views change as a process, experienced by individuals who seek to

or are being asked to change their behavior in particular ways. Instead of focusing on institutions in the study of the change process, the CBAM views the individual as the critical unit of analysis. The CBAM pays particular attention to two facets of the individual's developmental growth in relation to the innovation*. These two dimensions have been defined as Stages of Concern (Hall & Rutherford, 1976) that describe the feelings that individuals experience in regard to the innovation, and Levels of Use (Hall, Loucks, Rutherford, & Newlove, 1975) that describe individuals' behaviors as they experience the process of change.

The first major dimension, Stages of Concern About the Innovation (SoC), describes seven kinds of concerns that individuals experience at various times in the change process (See Figure 1). These range from early concerns about "Self" (How will the innovation affect me?), to concerns about "Task" (How can I best manage the innovation?), and finally, to concerns about "Impact" (How does the innovation affect my students?). Reliable and valid instruments for measuring Stages of Concern, as well as methods for interpreting the data, have been developed (Hall, George & Rutherford, 1977).

*The term "innovation" is used in a very broad sense, to refer to any idea, program, product or process that requires different behaviors of the user.

Figure 1

STAGES OF CONCERN:
TYPICAL EXPRESSIONS OF CONCERN ABOUT THE INNOVATION

STAGES OF CONCERN	EXPRESSIONS OF CONCERN
6 REFOCUSING	I have some ideas about something that would work even better.
5 COLLABORATION	I am concerned about relating what I am doing with what other instructors are doing.
4 CONSEQUENCE	How is my use affecting kids?
3 MANAGEMENT	I seem to be spending all my time in getting material ready.
2 PERSONAL	How will using it affect me?
1 INFORMATIONAL	I would like to know more about it.
0 AWARENESS	I am not concerned about it (the innovation).

The second major dimension of the CBAM is Levels of Use of the Innovation (LoU); eight levels have been defined (See Figure 2). LoU describes how performance changes as the individual becomes more familiar with an innovation and more skillful in using it. Individuals begin with "Orienting" themselves to the innovation. Characteristically, they first use an innovation at a "Mechanical" level; their planning is short-term, and their organization and coordination of the innovation are disjointed. As experience and familiarity with the new process or product increases, the individual generally moves to a "Routine" level of use and eventually may reach various "Refinement" levels, where changes are made based on the needs of students. A focused interview procedure has been developed to measure Levels of Use (Loucks, Newlove & Hall, 1976).

Figure 2

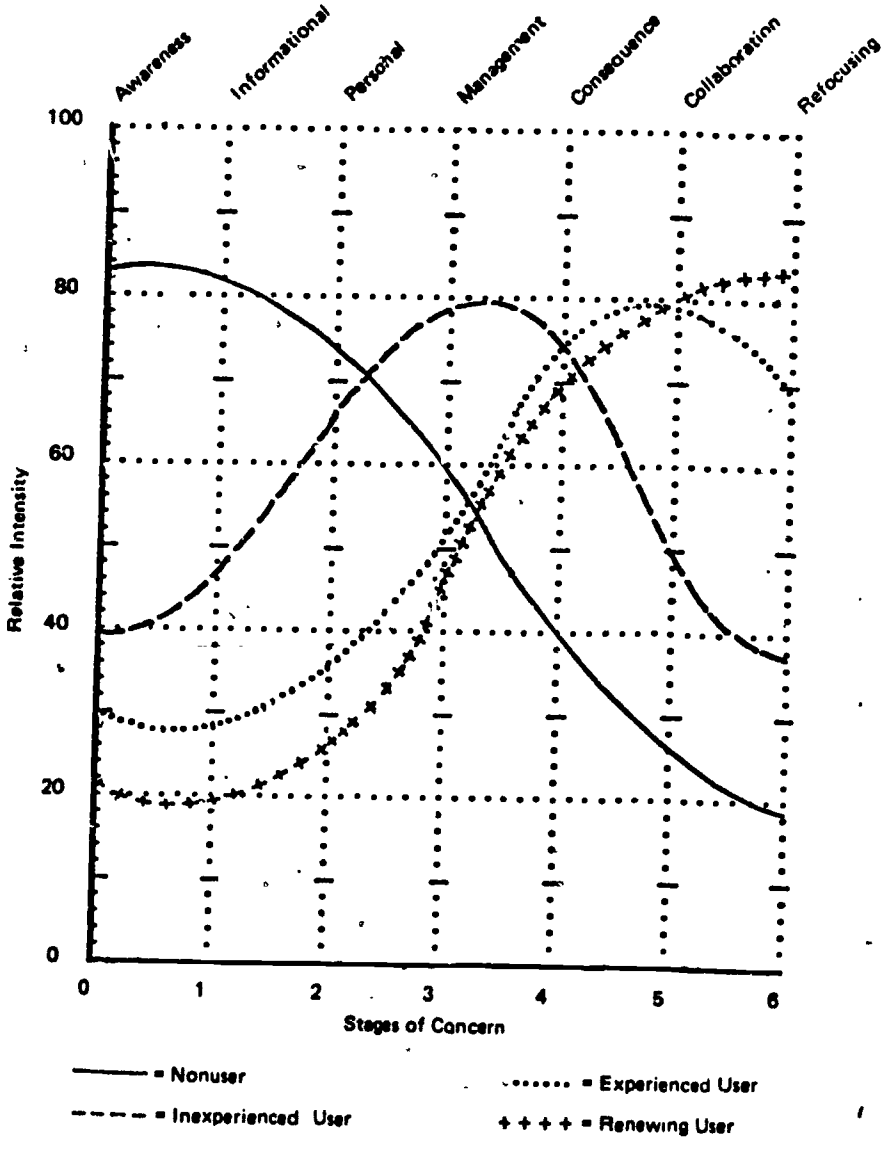
LEVELS OF USE OF THE INNOVATION:
TYPICAL BEHAVIORS

LEVELS OF USE		BEHAVIORAL INDICES OF LEVEL
VI	RENEWAL	The user is seeking more effective alternatives to the established use of the innovation.
V	INTEGRATION	The user is making deliberate efforts to coordinate with others in using the innovation.
IVB	REFINEMENT	The user is making changes to increase outcomes.
IVA	ROUTINE	The user is making few or no changes and has an established pattern of use.
III	MECHANICAL USE	The user is using the innovation in a poorly coordinated manner and is making user-oriented changes.
II	PREPARATION	The user is preparing to use the innovation.
I	ORIENTATION	The user is seeking out information about the innovation.
0	NONUSE	No action is being taken with respect to the innovation.

Two years of large-scale longitudinal research (1974-1976) served to develop, validate, and refine these concepts and the tools for their measurement. One finding from these studies was that Stages of Concern do appear to change over time in a predictable way. As noted in Figure 3 (Hall & Loucks, 1978), before teachers begin using an innovation, their concerns are relatively more intense at Stages 0, 1, and 2 (Awareness, Informational and Personal). First-time users have their most intense concerns at the Management stage (3). The research indicates that when the change effort is well planned, when users

Figure 3

Hypothesized Development of Stages of Concern



received adequate and ongoing support, and when the innovation is an appropriate one, experienced users can develop more intense concerns at the Consequence, Collaboration and Refocusing stages (Stages 4, 5 and 6).

Levels of Use also change in predictable ways (Hall & Loucks, 1977). Generally, individuals develop from Level 0 Nonuse through Level IVA Routine. At that point, the individual may move to any of the higher levels, back to Level III Mechanical use, or may remain at the Routine level indefinitely.

Knowledge about how concerns and levels of use of teachers involved in an implementation effort are likely to change over time can give change facilitators a guiding framework within which to plan support activities and other "interventions." This diagnostic model has been utilized in the planning of a district-wide implementation effort, and the results are being studied closely. A description of that study and the results to date follow below.

Designing a Concerns-Based Implementation Effort

A collaborative effort is currently underway with staff developers and curriculum coordinators in the school district of Jefferson County, Colorado (Jeffco). The district is actively engaged in implementing a revision of the science curriculum in grades three to six in their eighty elementary schools. The curriculum implementation, begun in August, 1976, has been designed so that inservice activities for teachers and corresponding support activities provided by principals and central office staff are coordinated to correspond to the concerns being expressed by teachers about the curriculum (Loucks & Pratt, 1979).

Inservice Before Use. As research has indicated, before teachers begin using an innovation, they have primarily information and personal concerns. Thus, activities designed for teachers before they become users should address

questions such as "what is it all about?" "how will it affect me?" and "how will I have to change what I'm doing now?"

These questions guided the first set of activities for Jeffco teachers' "pre-inservice" sessions. These sessions were held for small groups (teachers from two schools) in a familiar setting (one of their schools). The content was informational: a science department member described the program with an entertaining slide presentation, noted what changes had been made, described plans for inservice, suggested schedules for teaching, and distributed the new teacher's guide. The atmosphere was intimate and informal; a question and answer session enabled teachers to gain additional information, with the intent of helping resolve some personal and informational concerns.

Inservice for First Use. The CBAM would predict that first-time users have relatively intense concerns about management and are preoccupied with logistical issues: how much time the innovation is taking, how to arrange for and set up equipment, how to manage the classroom, how to stay ahead of the students. Thus, the next set of activities for Jeffco teachers concentrated on helping them plan, set up, and actually teach the new science units. Three released-time inservice days brought teachers from all schools together by grade level to participate in the same activities that they would be using with students, to learn some management techniques, and to become familiar with the dayto-day use of the program.

The three inservice days were spaced over a year's time in order to address management concerns about each unit as that unit was being taught. An effort to meet management concerns was also attempted by science department staff, who visited teachers and principals in informal "comfort and caring" sessions, wherein they could respond to idiosyncratic problems and needs.

Inservice for "Old Pro's". Although first users characteristically have primarily management concerns, some who have had experiences similar to those required by the innovation may have higher stage concerns, i.e., concerns about the impact of the innovation on students. Thus, Jeffco teacher inservice sessions were planned also to provide opportunities for teachers who chose to engage in activities developed to meet student-oriented concerns; e.g., the application of Piagetian concepts to the classroom, or refinement of discussion and questioning techniques.

Analyzing Interventions Made During the Implementation Effort

The previous section described briefly a design for curriculum implementation that was based on an understanding of teachers' concerns and how they change over time. How effective was this design in facilitating implementation of the science curriculum? This is the major question addressed by this paper. The first step in answering the question is to identify what was done by the facilitators (district staff developers and science department staff) and then relate those actions to teacher change. In order to identify what was done, a framework for analyzing facilitator "interventions" was necessary. Recent research at the R&D Center has defined interventions as "actions or events that influence use of the innovation" and has delineated five levels of intervention that are sponsored by facilitators: incident, tactic, strategy, game plan and policy (Hall, Zigarmi, & Hord, 1979). These levels are briefly defined in Figure 4. Some of the levels are utilized below to provide examples of major interventions in the Jeffco implementation effort. Teacher change data are then presented which coincide with the timing of the interventions.

Figure 4

SPONSORED INTERVENTION LEVELS

GAME PLAN	The overall design of an implementation effort, combining all the major components. Ideally, the game plan is specified in advance and modified during the change process.
STRATEGY	Strategies translate assumptions and theory about change into action. These represent the largest building blocks of the change effort.
TACTICS	Aggregation of incidents that in combination have an effect(s) that is larger or different from the effects of the individual incidents.
INCIDENTS	The singular occurrence of an action or event. These are the smallest intervention units with effects.

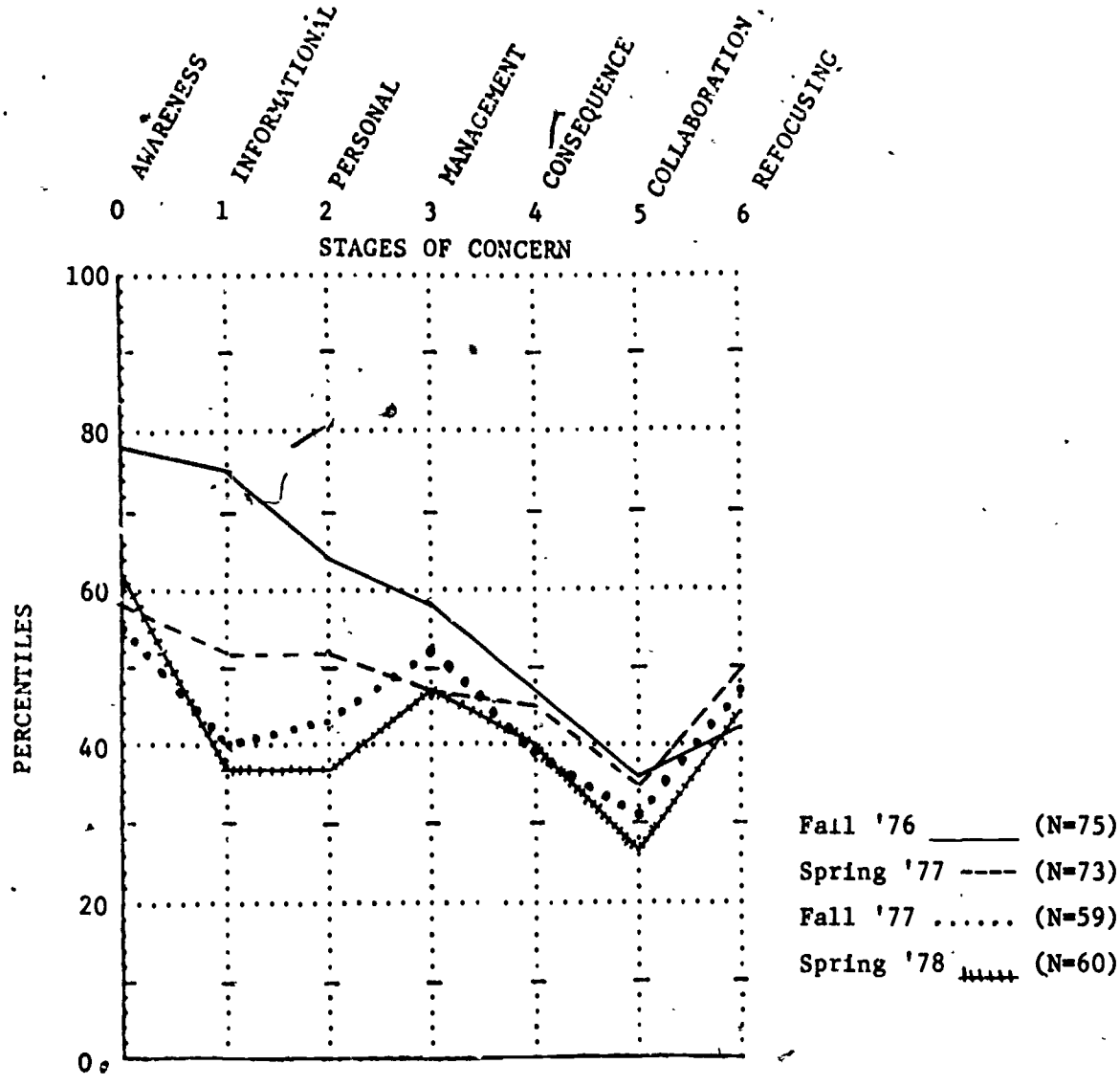
A Study to Assess the Effects of the Curriculum Implementation

A Game Plan Level Intervention. The game plan for the implementation effort included a year-long series of meetings, training sessions and follow-up activities designed to resolve the changing concerns of the teachers as the effort progressed. The long-range goal was to resolve teacher concerns at Stages 0-3, and have them using the innovation at a Routine (IVA) Level. The district was divided into three phases so that the facilitators would not have to work with teachers from all eighty elementary schools at once. Training for the phases began one-half school year apart (i.e., Phase I schools began inservice in January, 1977, Phase II schools in September, 1977, and Phase III schools in January, 1978).

What was the effect of the concerns-based game plan? As noted previously, two mesaures of teacher change were used: Stages of Concern About the Innovation and Levels of Use of the Innovation. Data for teachers from a representative sample of Phase I schools are displayed in Figure 5. Note that in the

Figure 5

Stages of Concern and Levels of Use Data for Phase I Teachers Over Two Years



Levels of Use (in percentages)

	0	I	II	III	IVA	IVB	V	VI	N
Fall '76	5%	9%	83%	1%	1%	-	-	-	75
Spring '77	-	4%	10%	53%	24%	7%	1%	1%	74
Fall '77	3%	3%	5%	38%	35%	-	13%	3%	63
Spring '78	2%	3%	2%	42%	34%	13%	3%	2%	62

fall, 1976 (before use began) the Stages of Concern profile is that of typical nonusers (high Stages 0, 1, 2, with other Stages lower). By spring, 1977, after two days of inservice training and beginning use of the new curriculum Stages 0 through 3 have dropped in intensity, with no increases except in Refocusing (SoC 6) concerns. In both fall, 1977, and spring, 1978, the highest Stage of Concern is Management (SoC 3),* with Refocusing (SoC 6) concerns still high.

Levels of Use data on the bottom of Figure 5 demonstrate that Phase I teachers shifted from predominantly LoU II Preparation to LoU III Mechanical use in the first year. By fall, 1977, (one year after introduction of the innovation), there is some decrease in the proportion of individuals at LoU III Mechanical, and an increase in the proportion at Routine and higher levels. In spring, 1978, there are still a significant number of teachers at LoU III Mechanical use.

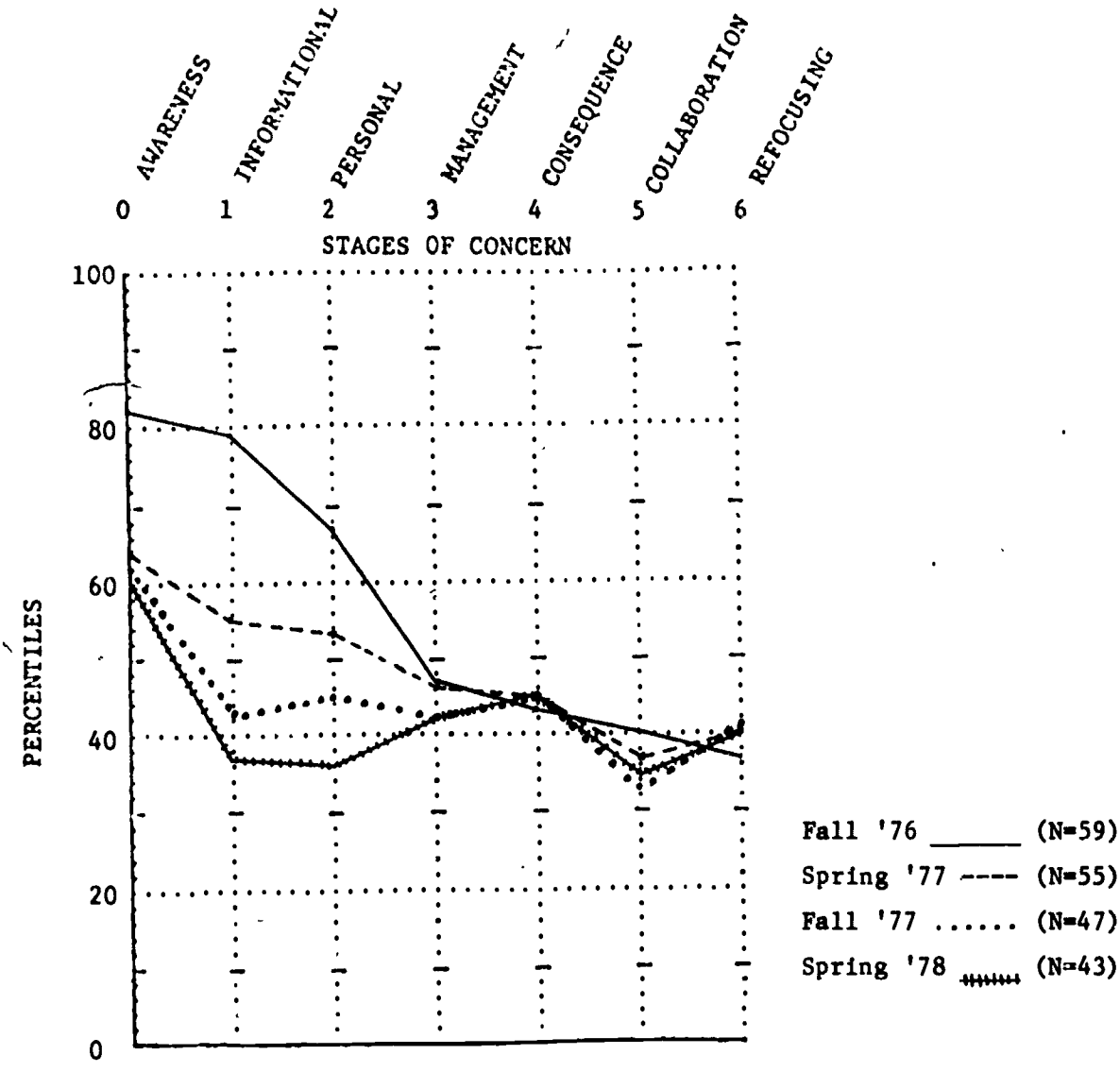
Figure 6 displays data for teachers from a random sample of Phase II schools, as a point of contrast to Phase I teachers. Note the major differences: in fall, 1976, Stages 0-2 of Phase II teachers were higher than Phase I teachers; Stage 6 concerns were never as pronounced in Phase II teachers. By spring, 1978, Consequence concerns (SoC 4) predominated in Phase II teachers, while Management concerns (SoC 3) predominated in those at Phase I.

Level of Use data displayed at the bottom of Figure 6 reflect the fact that there was a several month lag in inservice activities for Phase II teachers compared to those for Phase I teachers. Note, also, that spring, 1978, Levels of Use for Phase II teachers were predominantly at LoU III Mechanical Use.

*The consistently high Stage 0 scores evident in this study are interpreted to mean that this science curriculum was not viewed as a major issue by the teachers responding. See Hall, George, & Rutherford, 1977, for a full interpretation of Stage 0 scores.

Figure 6

Stages of Concern and Levels of Use Data for Phase II Teachers Over Two Years



Levels of Use (in percentages)

	0	I	II	III	IVA	IVB	V	VI	N
Fall '76	53%	3%	17%	5%	17%	5%	-	-	60
Spring '77	7%	5%	43%	19%	21%	3%	-	2%	58
Fall '77	4%	11%	11%	40%	23%	6%	4%	2%	53
Spring '78	9%	2%	2%	44%	24%	16%	-	2%	45

Discussion of Game Plan Level Interventions. The game plan for the Jeffco district was designed to resolve concerns at Stages 0-3 and facilitate the development of Routine (LoU IVA) use. Phase I teacher data indicate that Stage 1 and 2 concerns were largely resolved by the spring of 1978, (16 months after the first inservice), but Stage 3 (Management) concerns remained high. The high Stage 6 (Refocusing) concerns in conjunction with Stage 3 (Management) concerns suggest that teachers were uncomfortable with management problems and had (or were looking for) better ways of teaching the science curriculum. Level of Use data indicate that, at this time, (spring, 1978), the largest number of users were still performing at a Mechanical use level.

Similarly, the Stage 1 and 2 Concerns of Phase II teachers were greatly decreased in intensity by spring, 1978. However, in contrast, Phase II teachers were beginning to show signs of Consequence concerns emerging over Management concerns. They were still primarily at a Mechanical use level.

Two possibilities appear to exist to explain why so many teachers in both Phases were at the Mechanical use level. The most obvious is that the science curriculum requires so much coordination and planning; new materials, procedures, equipment, classroom management techniques, and even live animals and plants are required. It is reasonable to believe that conquering all the logistical problems may take more than just one cycle of teaching the complete unit, and possibly even more than two cycles. Another explanation rests in the high rate of teacher mobility between grade levels. It was discovered that a large number of teachers in the fall, 1977, and spring, 1978, were teaching grade levels for which they had received no science inservice training due to a change in grade levels from the previous year. Thus, it is reasonable to assume that

these first-time users would have even greater management problems than when they had taught the other grade level the year before, with sufficient training and preparation.

The difference in Phase I and II teacher concerns as they changed over time might be explained in two ways. First, the facilitators (who worked with both groups) may have become more skillful in delivering inservice training focused on resolving Management concerns. Thus, Phase II teachers, who were trained months after Phase I teachers, may have received better targeted training.

The second explanation involves the teacher population. Schools in Phase II are on year-round calendars and are generally the more progressive, innovative schools in the system because of the flexibility and teamwork demanded by the situation. These schools are also located in the growing parts of the district and tend to have younger staffs. Thus, teachers in these schools may be more accustomed to change than those in Phase I schools, and may be more apt to move through the Stages of Concern more rapidly than Phase I teachers. Both of these explanations may have contributed to the difference in concerns.

A Tactic Level Intervention. One common type of tactic intervention is a training workshop. The full-day, released-time inservice workshops held to train Jeffco teachers to use the science curriculum focused largely on Management (SoC 3) concerns. However, it was known that some county teachers were already experienced in activity-oriented science teaching and possibly would be open to more impact-oriented input. Thus, part of each workshop provided teachers a choice between remaining in small groups with teacher trainers in order to gain more direct hands-on experience with the new science units, or utilizing a selfpaced module to learn or refine teaching skills, such as a focus on discussion techniques or using the out-of-doors. In the remainder of this

paper, these two options are called "Management Concerns Alternative" and "Consequence Concerns Alternative," respectively.

Two questions were asked about this particular intervention. First, do teachers with different concerns select learning paths specifically designed to address different concerns (i.e., in this case, do teachers with Management concerns select the Management Concerns Alternative, and those with Consequence concerns select the Consequence Concerns Alternative)? Second, how do the concerns of teachers involved in either activity change following the inservice?

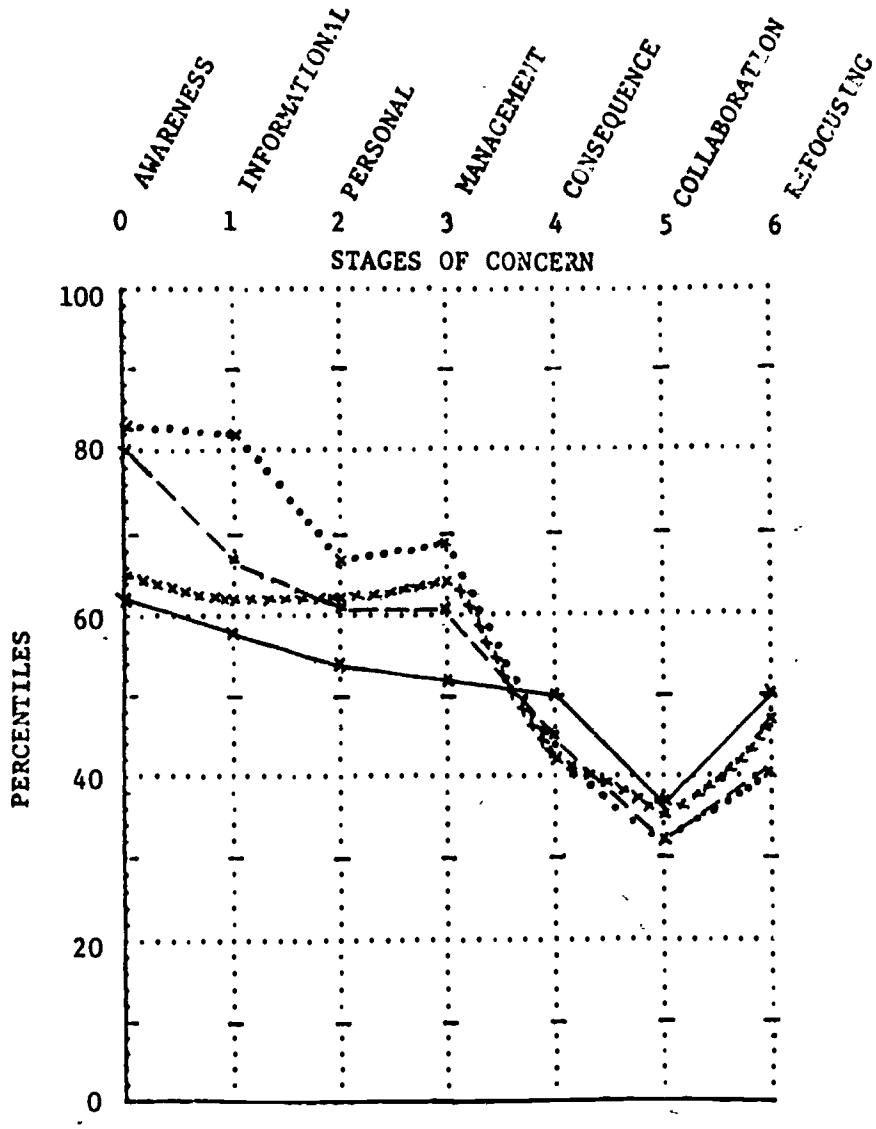
Stages of Concern data were collected from teachers in all Phase I schools one month before the first inservice workshop and one month afterward, prior to a second workshop. At the inservice session, a record was made of teacher option selections, so that concerns data could be compared later between the two groups.

Figure 7 displays data from Phase I, third grade teachers. The dotted and dashed curves are profiles of the two groups before the workshop (i.e., those who chose the Management Concerns Alternative and those who chose the Consequence Concerns Alternative, respectively). Note that both profiles indicate that both groups were nonusers, with Informational, Personal and Management concerns. Note, also, that the teachers that chose the Management Concerns Alternative were significantly higher on all these concerns than were those who chose the other option.

The "xxxx" and solid lines in Figure 7 are profiles of these same two teacher groups whose concerns were monitored after the first inservice session. Note that Stage 0 through 3 concerns have decreased for both groups. Note, also, that higher stage concerns are beginning to increase in intensity, particularly for the teachers who chose the Consequence Concerns Alternative. Manage-

Figure 7

Stages of Concern Data for Phase 1 Third Grade Teachers Selecting Alternative Workshop Activities



Chose Consequence Concerns Alternative, February, 1977 _____ (N=23)

Chose Management Concerns Alternative, February, 1977 xxxxx (N=15)

Chose Consequence Concerns Alternative, November, 1976 ..... (N=18)

Chose Management Concerns Alternative, November, 1976 ----- (N=23)

ment concerns are emerging as dominant for the first group, but becoming more in balance with Consequence concerns for the second group.

Discussion of Tactic Level Intervention. Two questions were posed in the previous section. The first one essentially asked whether or not teachers make learning choices according to their concerns. It appears the answer is, at least, a partial "yes." Teachers who chose the course targeted toward Management concerns had higher Management concerns than those who chose the alternative designed for those with Consequence concerns. Although a viable strategy for the facilitation of growth in concerns toward an innovation might be the assignment of learning activities according to teacher concerns levels, these findings indicate that self-selection may be just as effective.

The second question is how concerns of teachers change following this particular tactic level intervention. The data presented here indicate that all teachers' Stage 0 through 3 concerns decreased in intensity, and that their higher stage concerns (Stages 4 through 6) increased. Although no causality is proven by these data, it may be inferred that workshop activities resolved some of the "what is it?," "how will it affect me?" and "how do I do it?" kinds of concerns, and allowed the more student-oriented concerns to emerge. Teachers who chose the Consequence Concerns Alternative, i.e., those whose management concerns were lower to begin with, had an even greater decrease in Management concerns, with Consequence concerns increasing to a relatively great extent.

The goal of the three inservice workshops was to resolve Stage 0-3 concerns. These sample data from the first workshop for Phase I, third-grade teachers provides an example of movement in this direction.

Incident Level Interventions. Incidents are the smallest level of intervention; they are the short actions, often one on one, that may indeed make or

break a change effort (Hall, Zigarmi & Hord, 1979). The effect of incident interventions in the Jeffco implementation effort can be illustrated by examination of the actions taken by individual principals in schools where the revised program was being implemented.

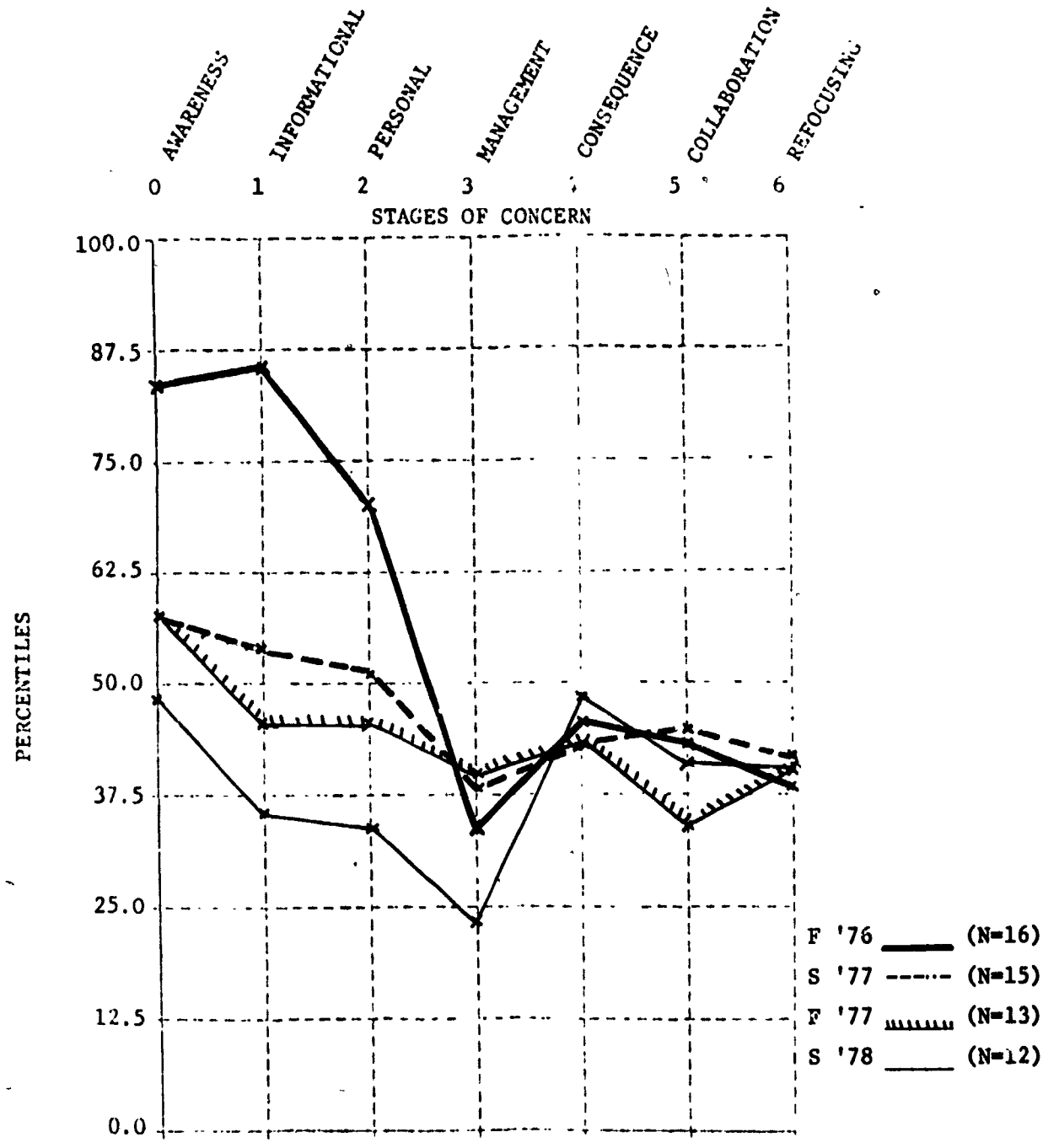
It is becoming increasingly clear that the actions taken by building principals to support or inhibit a change effort has direct effect on how teachers feel about and ultimately use a new program. In the past, much focus has been on the leadership and administrative style of the principal and on the climate fostered by that style in the school. Research in Jeffco and other field sites suggests a different approach to the study of principal effects; i.e., an examination of interventions made in relation to the change effort.

In Jefferson County the eighty principals were introduced to the revised science program before the teachers, in an attempt to create the vital physical and moral support system necessary for classroom change to occur. During a half-day meeting, principals received an overview of the program, details about the equipment and material needed and procedures for ordering and maintaining them. They were also given an introduction to the concept of Stages of Concern in order to provide a framework for teacher inservice activities and to give guidance in the provision of appropriate support.

Principals reacted to the new program in different ways. Some were highly supportive, providing continual interventions to assist the teachers to use the program. Figure 8 depicts the concerns and use data of a Phase II school with such a principal. In that school (#1) equipment was always available. In one recorded incident, a teacher reported she could not teach a unit because she did not have sufficient microscopes; the next day she was greeted by a row of them on her desk, scrounged from somewhere by the principal. In this school, teach-

Figure 8

Stages of Concern and Levels of Use Data for Teachers in School 1



Levels of Use (in percentages)

	0	I	II	III	IVA	IVB	V	VI	N
Fall '76	63%	-	31%	6%	-	-	-	-	16
Spring '77	6%	6%	38%	19%	31%	-	-	-	16
Fall '77	-	-	21%	36%	29%	-	14%	-	14
Spring '78	8%	-	-	33%	50%	-	-	8%	12

ers knew that teaching the science program was a priority; the principal made certain that new teachers and those at new grade levels received the necessary training to teach the new units. He made certain that the time allotted to teaching science in each classroom met the district requirements. He constantly visited classrooms, assisted with lessons, and talked about children continually.

As illustrated in Figure 8, the concerns of teachers in School 1 were never high on the Management Stage (SoC 3). At the end of the second year of data collection, half of the teachers were at Routine Level of Use (IVA), and their concerns were clearly at the Consequence stage.

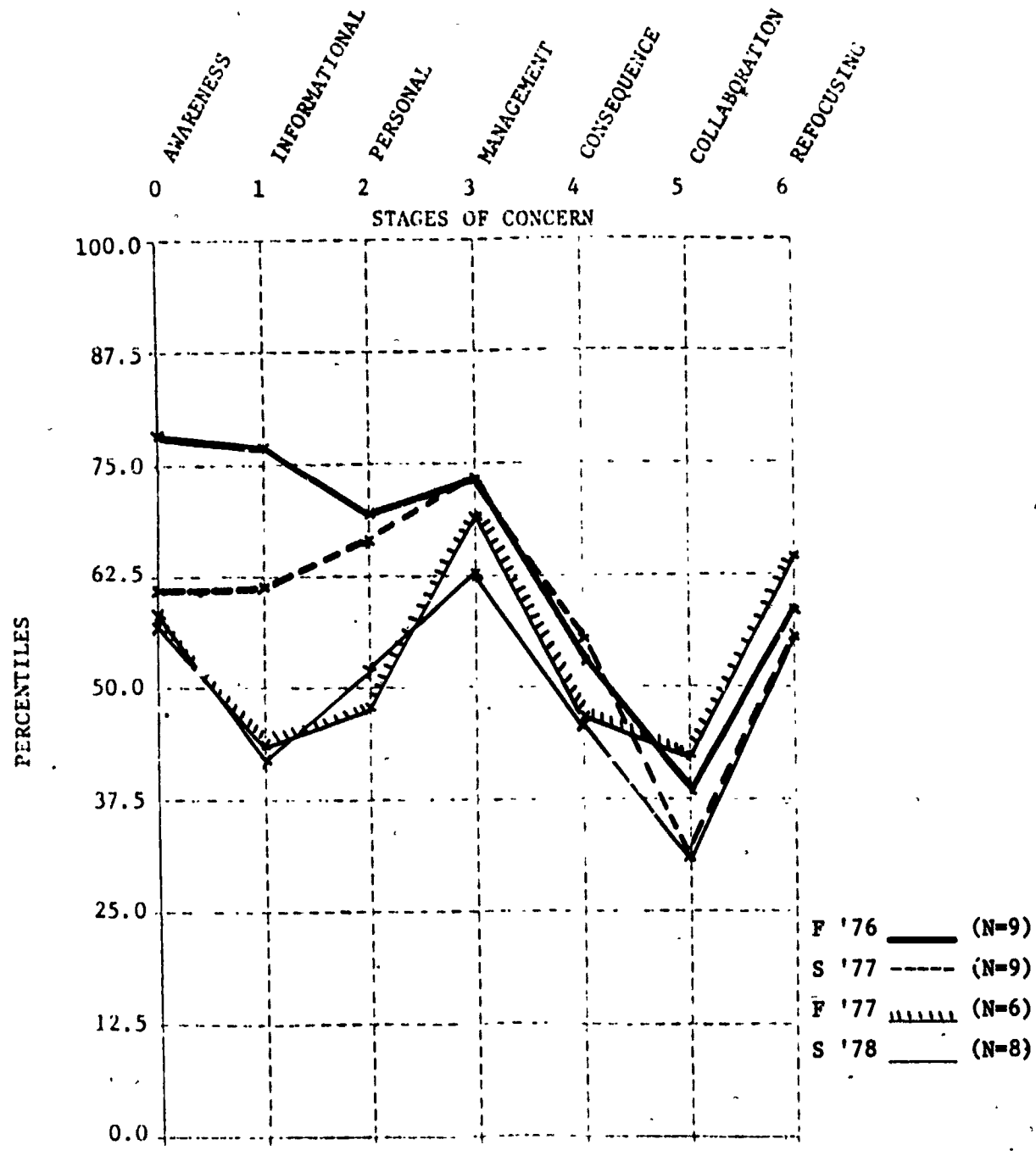
In contrast to the principal from School 1, other principals did not react to the science program in a supportive or facilitative manner. Figure 9 reports data from a Phase I school with an inactive principal. The principal never actively communicated support for the program and the allottment of sufficient time to teach science was at the discretion of the teachers. No special effort was made to insure that individual teachers had the necessary supplies and equipment.

Figure 9 illustrates that teachers in this school (#2) always had highly intense Management concerns. In addition, their Refocusing concerns are also high. Levels of Use data indicate that a significant number of users remained at Mechanical Level of Use after two years of implementation of the program.

Discussion of Incident Level Interventions. It is impossible in this kind of study to draw conclusions about the effects of incident interventions. However, the different kinds of incident interventions made by principals in each of these schools, and the corresponding concerns and use data, do support other studies that suggest that principals' actions are of great import in the course

Figure 9

Stages of Concern and Levels of Use Data for Teachers in School 2



Levels of Use (in percentages)

	0	I	II	III	IVA	IVB	V	VI	N
Fall '76	11%	22%	67%	-	-	-	-	-	9
Spring '77	-	-	-	89%	-	11%	-	-	9
Fall '77	13%	-	-	63%	25%	-	-	-	8
Spring '78	14%	-	-	43%	14%	29%	-	-	7

of a change effort. This hypothesis is to be the subject of future research.

These two schools provide a sharp contrast. In School 1, incident interventions supported innovation use through the provision of needed materials and establishing the fact that science teaching was a priority. In School 2, principal inaction clearly communicated that use of the program was up to individual teachers, who had to "fend for themselves" if they wanted to implement the new curriculum.

The data raise many questions. First, how important are the interventions of principals? Are there other factors (e.g., teacher propensity for change, school reorganization) that have greater effect on implementation? Further, if principals do affect change in their schools, what kinds of incident interventions are the most facilitating and which are inhibiting? Also, is it realistic to expect the environment to "stand still" while one implementation effort is underway, or are outside events inevitable? If so, what can a principal do to control them and their intervening effects on the implementation process? These questions and more will guide future investigation of principal interventions in change efforts.

Discussion of Findings

A basic assumption of the Concerns-Based Adoption Model (CBAM) is that change is a process, not an event. The data reported in this paper, collected during two years of implementation of a revised science curriculum in Jeffco schools, confirm this assumption. Teachers' concerns and their use levels of the curriculum changed continuously and in a developmental way.

Several insights have resulted from examination of the implementation design and concurrent data collection at the Jeffco field site. Some of these have direct implications for facilitators of change efforts. Others raise issues that provide direction for future research. The following discussion elucidates several of these findings.

1) Implementing an innovation takes more than one year. From the CBAM perspective, an innovation cannot be said to be "institutionalized" until teachers are at a Routine Level of Use or above, and have their Informational, Personal and Management concerns relatively low in intensity. In the data reported from this study and in years of previous research, it has been found that Management concerns and Mechanical Level of Use clearly predominate during the first year of use. It appears that if the innovation is appropriate and, if the change facilitators are effective and there is organizational support, institutionalization may occur with a relatively simple innovation, as was found in a few Jeffco schools. However, if the innovation is complex or is actually a "bundle" of innovations, or if the change process is poorly managed, institutionalization may take three to five years, or may never be achieved.

One implication of the temporal considerations for change research is that a multi-year longitudinal study design is required if implementation questions are to be accurately assessed. In addition, change facilitators and policymakers must come to acknowledge the time requirements of a change effort, and set realistic expectations for themselves, teachers, administrators and evaluators.

2) Stages of Concern and Levels of Use are useful tools to guide and monitor a change effort. In the implementation of the Jeffco science curriculum, Stages of Concern and Levels of Use unfolded in the directions and sequence

that theory and past research suggest. The concepts and data were useful to change facilitators in planning and guiding the change process and as criteria for monitoring progress.

Written evaluations and informal assessments indicated that most of the teachers and administrators affected by the science implementation were satisfied with the concerns-based interventions. This would suggest that this approach was at least as good if not better than approaches that had been used in the past. One interesting side effect was that several district level administrators viewed the effort as so successful that they wanted to know why it could not have been done in less time.

3) The principal plays a key role in the arousal of impact concerns. Large school-level differences in the data suggest that, when district level interventions are held constant, what a principal does or doesn't do makes a major difference in the rate of movement of a change process. In schools where principals are proactive in supporting their teachers' use of the innovation, lower stage concerns remain low in intensity or are quickly resolved, and impact concerns become aroused. If, on the other hand, the principal takes a laissez-faire approach or acts counter to the requirements of the innovation, then Management concerns remain high for an indefinite period of time and Levels of Use remain at the Mechanical and, at best, Routine levels.

Investigation about what principals do that facilitates or inhibits the change process is planned as a major thrust of future Texas R&D Center research. Descriptions of principal actions and their effects, and the alternate roles principals can take in relation to the change process are needed. As this information is collected, hypotheses will be developed and tested by future, more specific research designs.

Additional Questions Raised by the Research

Several questions and issues have been raised as a result of the work conducted with the Jefferson County science curriculum.

1) What are the dynamics of the arousal and resolution of concerns? From many years of clinical experience and grounded research, notions about relevant interventions for persons with intense concerns at different stages have emerged (Hall, 1979). But the dynamics of certain Stages of Concern and how these concerns become resolved are not clear. How much of the movement in concerns is attributed to traits of the individual versus characteristics of his or her environment versus characteristics of the change itself? Why is it that some people seem to move very quickly to higher concerns stages and others never exhibit them? How important is colleague influence?

2) What difference does all of this make for learners? The research that is reported here does not look at the outcomes that are associated with the innovation. Rather, it focuses on developing generic understandings of the change process from a concerns-based perspective. However, the effects of the innovation pm ;earmers are intriquing to ponder. Do teachers with a certain concerns profile at a certain Level of Use have an effect that is significantly different from those teachers at a different Level of Use and with a different concerns profile? What are the effects of the change process on learners? Do those who have contact with the innovation during its first year of use have a different experience from learners who experience the second, third, or fifth year of use? The most likely response to all of these questions is that "it depends." Certainly it depends upon the nature of the innovation itself. But at least part of the variance is likely due to the teacher's Stage of Concern and Level of Use.

It could be that, in time, before change is considered in a school, a "change impact statement" will be required, just as environmental impact statements are needed before construction can occur at particular locations. A key part of a change impact statement would be description of the potential harms and benefits of the innovation, and the potential costs and benefits of the required change process to the system, principals, teachers, and learners. As more is learned about the change process, and as we are better able to assess the impact of change on various audiences, the closer we will come to realizing this possibility. A better understanding of what affects teachers' concerns and use of change programs, and how these in turn affect learners, is one step in that direction.

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