Beyond Testimonials: Learning from a Quality Circles Program

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ABSTRACT

Quality circles programs are based on the assumptions that employee
participation leads to valued outcomes such as intrinsic satisfaction
and recognition, and that it also results in the implementation of
changes which enhance productivity and satisfaction. An in-depth case
study of one such program finds that generally favorable testimonials by
participants may be misleading. This program yielded a few minor
changes but little impact on productivity and attitudes in the unit as a
whole. Causes for its demise are discussed.

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INTRODUCTION

The widespread adoption of Quality Circles (Q.C.) programs is one
of the most intriguing phenomena of the recent productivity emphasis in
American organizations. A search of available literature reveals
glowing testimonials of their effectiveness in American companies (e.g.,
Yager, 1981; Personnel Journal, 1981) and accounts of their role in
helping propel Japanese industry to preeminence in the modern world
economy. To date, however, there has been little inquiry into the
theoretical underpinnings of this technique. Nor has there been much
systematic examination of Q.C. impact on desired outcomes.

Cole (1980) and others have warned that these participatory
structures may have different effects in the American culture than in
the more homogeneous culture of Japan, where workers identify strongly
with their company and where there is a strong group orientation
(Pascale and Athos, 1981). In Japan, quality circles are an extension
of an organizational climate that stresses worker development and
participation. In the U.S., they are often introduced by decree into
settings in which worker participation is not customary and where the
opportunity to participate is a scarce resource for people throughout
the organization. Quality circles have been introduced into a broader
array of contexts in the U.S., (Ohmae, 1982) and have addressed a wider
range of issue areas, including productivity and quality of worklife
concerns as well as the quality focus of the original Japanese quality
control circles.

Given these cultural and contextual differences, it seems imperative to monitor the results of Q.C. programs in American business settings. This paper presents an in-depth examination of the implementation of a quality circle program in a large food-retailing organization. The program was studied for five months prior to the beginning of circle activity and for one year after start-up. Formal and informal interviews and observations were used to explore contextual and design variables which contributed to attitude survey and productivity outcomes. The research was guided by a conceptual model (Mohrman, 1982) developed to predict the impact of employee participation on productivity and attitude outcomes.

THE QUALITY CIRCLES PROGRAM

A quality circle is a small group of workers who apply problem-solving techniques to problems in their work setting. The quality circles program which is the subject of this study was implemented in a warehousing operation which receives and warehouses perishable products from neighboring processing facilities and loads trucks with the orders for 150 retail supermarkets. The circle program was implemented as a pilot, and was one part of an overall corporate strategy toward increased employee involvement. Employee participation was seen as a means of coping with rapid growth and the transformation of the company from a relatively small, family-run organization to a large, partially automated operation with modernized facilities, retailing practices and managerial techniques.

Department management in this 80 person two-shift operation volunteered to adopt the Q.C. program. The six supervisors and department head had been exposed to human resources concepts through an

earlier team building process. The implementation of the circles program was preceded by a survey feedback process in which the results of a general organizational survey were fed back to groups of workers by specially trained co-workers. As survey feedback was a common practice in the company, its use was not perceived as an unusual intervention. Survey results triggered discussions around feelings of exclusion from information and decision making in the department. All but four of the 80 department workers volunteered to be part of a pilot circles program. The program which was implemented had the following characteristics:

- Four 10 person <u>problem-solving "teams"</u> composed of a cross section of workers familiar with the warehousing operation

- <u>Worker leaders and co-leaders</u> who were exposed to two days of training in communication techniques, group process and various problem-solving techniques

- <u>Facilitation</u> by members of the human resource department who attended meetings, helped the leader train the team members, and provided process assistance.

- <u>Regularly scheduled two-hour meetings</u> at two-week intervals

- <u>Leader circle</u> which met regularly to exchange ideas, concerns and information and to ensure coordination between groups

- <u>Management steering committee</u> consisting of the department head and several of the top managers of the warehouse complex.

The supervisors originally intended to attend meetings and serve as resources to the teams. In addition, regular meetings of the department manager, the supervisors, and the group leaders were planned. After it became clear that the original resolve of supervisors to be active in the circle process was weakening, one interested supervisor became the resource to all of the circles and began to spend a great deal of time on circle business. In addition, the department manager was highly interested in and committed to the program, attended many meetings, and took an active role in facilitating many of the team issues.

Because of the large number of workers who wanted to be part of the problem-solving groups, it was decided by management to have periodic rotations at which time individuals could choose to drop off teams and other volunteers could replace them. One such rotation occurred after 5 months. Twelve members dropped off, several more had left the department, and 29 workers joined the teams. Leaders received 12 additional hours of training and several circle meetings were spent training and orienting the reconstituted groups.

THE STUDY

The Research Strategy

Quality circles programs are designed to create a participative forum in which workers can generate solutions to workplace problems which can enhance quality, productivity or other desired outcomes. The evaluation of such a program must focus on more than change in the outcome measures. Although aimed primarily at changing behavior, circles also are structural modifications. Both the emergent structure and processes will be constrained by the context in which they are implemented, and in turn will impact on that context. A complete evaluation would take into account the nature of the program that is actually implemented, the processes and events which affect program implementation and those that intervene between the circle start-up and the resulting outcomes (Suchman, 1967).

An O.D. intervention such as a quality circles program is not a well-specified independent variable. Qualitative case-analytic techniques are appropriate for understanding what actually went on during the intervention while quantitative and (hopefully) quasi-experimental techniques can be used to measure impact (Roberts and

Porras, 1982). This study combines a non-equivalent pre- and post-control group design with a detailed qualitative case study of the experimental unit. The general strategy was to collect a variety of data using multiple methods, in order to increase the likelihood of tracking events of the intervention as they unfolded and of detecting multiple outcomes. This adaptive research approach (Lawler, 1977) is appropriate in view of the fact that individuals in the organization are responding and tailoring their actions to the same general kinds of information that are being observed by the researcher.

A clear conceptual model which permits the articulation of multiple predictions about the relations of events to one another and about expected outcomes can enhance the research of a complex social intervention. The greater the number of researcher expectations that are confirmed by the events and data of the case, the more confident the researcher can be that the intervention is operating as anticipated and is having the intended impact. This approach has been suggested by Campbell (1970) for situations in which randomization and sophisticated quasi-experimental designs are not possible. The conceptual model which guides this research model will be presented below.

The Conceptual Model

The assumptions underlying the present interest in QC programs are that they will positively impact both productivity and worker attitudes (e.g., Cole, 1980; Yager, 1981). Cost reduction, quality improvement, and (less frequently) quantity improvement are among the company benefits that are cited in the literature. Increased skill development, greater interest in the company, enriched jobs and greater recognition are the individual-level benefits. The individual outcomes are expected

to increase motivation and effort, thus positively impacting on productivity through yet another causal chain. Two distinct sets of causal assumptions are implied in literature describing the Q.C. approach.

Diagram A illustrates a causal sequence in which the implementation of the ideas generated by quality circles leads to productivity improvement, increased employee satisfaction and feelings of involvement of the employees. Several intervening variables could be expected to interrupt or facilitate this sequence. Effective group functioning occurs when the group possesses sufficient skills, when group members are motivated to exert effort, and when the group has an appropriate performance strategy (Hackman and Morris, 1977). The generation of ideas is expected to occur only if the circle members possess adequate problem-solving, group process and presentation skills, and if they have sufficient task-relevant information. Leadership of the group is expected to be critical especially at the early stages of circle functioning, when most members are relative novices at group problem-solving.

The likelihood that ideas which have been generated will be implemented depends largely on the level of management support for the Q.C. program, and its willingness to demonstrate that support by authorizing the necessary resources. In some instances, management may have to take responsibility for actual implementation of the ideas. In areas where the group has the necessary authority to implement an idea, successful implementation will depend on the strategies and skills the group uses in the implementation process. For many employees, the generation and implementation of ideas for change is a new task. A

great deal of effort will be required to master the necessary skills and strategies and to utilize them to produce high quality problem-solutions and to withstand the frustrations and requirements of change implementation.

If implementation does occur, impact on productivity will result only if the ideas for change solve problems which facilitate increased performance and/or real cost savings. Employee satisfaction is likely to be enhanced by the implementation of ideas which result in a favorable change in the job itself, its context, and/or the outcomes experienced by the individual. According to this logic, the problem content and the nature of the solution will determine how the outcome variables of interest are affected. It is conceivable that the circle may generate an idea which has opposite impact on productivity and attitudinal variables.

A second often-mentioned link between participation in a quality circle and productivity and attitudinal outcomes is presented in Diagram B. According to this logic, participation in a circle is expected to result in individual level outcomes such as recognition, development and social rewards, which in turn are expected to promote job satisfaction, motivation and improved task performance. The motivation and job performance increments may lead to improved productivity. Increased job satisfaction may positively impact productivity through resulting decreases in turnover and absenteeism (Lawler and Ledford, 1982).

This causal chain can also be enhanced or interrupted by intervening variables. For example, the positive individual level variables which are depicted as direct outcomes of participation will

only result if the circle has accomplishments, people feel involved in and part of the group, and if they see their involvement as an important part of their job. Skill and knowledge will result if training and problem-solving result in individual development. Management recognition only occurs if management goes to the "trouble" of recognizing the group, and by implication only if the group has accomplishments which merit recognition.

The impact of these individual outcomes on job satisfaction, motivation and task performance may be moderated by individual differences such as growth needs (Hackman and Lawler, 1971). Improved task performance is most likely to occur if the problem-solving and group process skills which are learned in a circle are transferable to the primary job of the individual. Finally, the link between the individual outcomes of circle performance and job satisfaction may be interrupted if the individual feels that outcomes are inequitable.

The increases in productivity that are anticipated as a result of these implied causal chains are far from automatic. In fact, they rest on a string of conditions. The two potential routes from quality circles to the outcomes which are represented in the diagrams can work concurrently. There is an important difference between them, however. Diagram A hypothesizes outcomes which can accrue to all members of a unit which has a quality circle, since the outcomes stem from implementation of ideas rather than from participation in the circle. Diagram B depicts a relationship between participation in a circle and desired outcomes. It will be thus important to examine the attitudinal change of both the participants and the non-participants in a circle. It is possible that the two groups may change in opposite directions if

the generation of ideas does not result in changes which are satisfying to non-participants. Studies of other quality of worklife experiments have found that representative participation has more beneficial impact on direct participants than on non-involved workers (Nurick, 1982; Macy and Peterson, 1981).

The Control Group

A control department was carefully selected to match the experimenting unit in size, nature of tasks and department structure. Preliminary survey data and interviews indicated that the control department was perceived by its workers to have a slightly more favorable climate; however differences were statistically significant on fewer than 10% of the scales. Workers in the two departments did not differ along any demographic dimension. Interviews indicated that there was not much communication between the members of the two units.

The work volume of both departments increased significantly during the 17 month period of the study, reflecting the rapid growth of the business. Neither department increased its workforce to handle this growth. The control department, however, underwent physical facilities expansion, which may have been in part responsible for a drop in attitude scores over the 17 months. Growth, expansion and change were the order of the times in this company, however, and it is unlikely that a more stable control group could have been found.

Comparable attitude survey and productivity measures were collected in the control and experimenting departments. Attitude survey data were returned to department management and were fed back to the workforce in both units.

The Data

Attitude survey data were collected at three points in time: (1) five months prior to the beginning of problem-solving activities; (2) three months after the beginning of the program; and (3) ten months after program initiation. Survey scales were largely taken from standard instruments such as the Michigan Assessment of Organizations (Lawler et al., 1980). A large number of attitudes toward job, department, and organization were measured. Ten scales are reported in this paper because of their relevance to the conceputal models which have been presented. They deal with the level of communication and information in the organization, the extent of involvement in problem solving and participation in decision making, with affective reactions such as trust and satisfaction, and with external turnover intent. Reliabilities (coefficient alphas) are reported in Table 5. They range from .61 to .88.

Six archival measures, including several productivity indicators (costs, throughput and labor costs as a percentage of total costs), overtime costs, absenteeism and accident rates were tracked at 4-week intervals beginning one year prior to program initiation. These measures had been substantially redeveloped at that time, precluding the collection of comparable data for a longer time period in advance. The six measures were viewed by the company as accurate and valid indicators of productivity.

Substantial qualitative information was collected. One member of the research team spent four days per month on site. Informal open-ended interviews were conducted with department managers, group leaders and other key personnel on each visit. Formal open-ended interviews

were conducted with a random sample of 8 department workers every two months. The samples were stratified to include both participants and non-participants in the problem solving teams. The intent was to elicit the reactions of both involved and uninvolved workers to the employee participation program. Early interviews solicited expectations and hopes for the problem-solving program. Later interviews probed reactions to the program, including perceptions of accomplishments, views of management support, perceived problems and significance attached to the program.

Circle meetings were observed and detailed descriptive field notes were prepared approximately once each month, providing a general sense of group activities and the level of proficiency of the group problem-solving processes. Additionally, the research team was provided with copies of all documentation which emerged from the circles.

The frequent presence of a research team member on site was critical to the research. This individual became trusted by the department members and was therefore able to obtain richer and more balanced information about people's perceptions of the circle program than the generally positive information which emerged from official company channels. The tendency of an experimental program to be surrounded by positive information may be evidence of what Campbell (1969) has referred to as the "trapped administrator" phenomenon. Managers who sponsor or become associated with a program may be reluctant to allow negative information to emerge if career interests are tied up with program success or if short-term pressure might lead to premature program cancellation.

Objective of the Study

The purpose of the study was to learn about the impact of the QC process and the barriers and strengths of the implementation process. It was also to detect strengths and weaknesses of the design, and to determine the costs, including the unanticipated side effects, of the problem-solving program. This was congruent with the company's stated objective of learning from this program in order to develop a strategy for the gradual transformation of the company's culture toward higher worker involvement.

THE FINDINGS

General Results

"Testimonials" concerning this program sound very much like those that are found in the popular literature. Corporate personnel were pleased with the program. One idea alone is expected to save the company $150,000 per year. When combined with other cost savings ideas of less major impact, the payback is quite satisfactory for a program which cost less than $80,000 for the initial implementation year.

An enthusiastic and competent presentation was made by representatives of the problem-solving teams to the executive committee of the corporation. Those workers expressed their opinion that this program is one of the most fulfilling aspects of their job and is having a very positive impact on the department. The program is being refined and expanded to other departments in the warehouse complex.

A less optimistic description would point out that the major cost-saving idea referred to in the preceding paragraph had not yet been implemented due to eight months of red tape, and that the department management felt that there were as yet no major cost-savings because of

circle suggestions. After one year, the circles were at a complete standstill, largely because they had been reduced in priority due to a large increase in the volume of work in the department and because of lagging enthusiasm from participants. Supervisors and department managers alike were less enthusiastic in their support and willingness to make time for the meetings to occur. Some participants had become disillusioned because they were beginning to sense that the changes they had made had not had a noticeable impact on their jobs or the quality of their worklife. Several of the most active circle leaders and members were disillusioned by their failure to be appointed to any of the supervisory positions which had become vacant in the warehouse, despite their demonstration of leadership in the circle process.

A balanced perspective emerged in the last round of interviews, which had a somewhat bittersweet feel. On the one hand, participants in the Q.C. process felt that they had learned a lot, had enjoyed the process, and felt good about what their groups had accomplished. Non-participants or those who had dropped off of circles felt that the circles had never grappled with the "really important" issues of the department. Supervisors felt that the payback did not warrant the amount of time spent and the hassle of scheduling around the meetings. The department manager was discouraged that the groups had never developed an independent spirit and had allowed ideas and suggestions to die on the vine rather than take the necessary steps to follow up and put energy into making sure things happened. Most striking was that everyone interviewed felt that the program was a good idea and that some form of employee participation was very important and badly needed.

Circle Achievements

Table 1 provides examples of the accomplishments of the four teams. Most activity was in areas very similar to those reported in the literature: equipment, damage, congestion, training and maintenance. Teams had received a very general mandate to identify and solve problems. Tapes and observations of meetings indicate that they were steered into "manageable issue areas" by the facilitators and by the department manager. The areas the groups dealt with contrasted with the hopes workers expressed in initial interviews that the program would explore issues of employee development, career progression, job definitions and work and pay equity. Interviews surfaced some disappointment that little was done in these areas.

The appearance of considerable team activity is a bit deceiving. Many of the achievements emerged from one of the four teams. Two teams generated very few ideas. Some solutions were generated but not implemented, and other solutions were implemented but discontinued. A few changes were both implemented and continued. For example, a camera was installed in an automated staging area so that workers could detect mechanical difficulties that might lead to spillage. The solution estimated to save the most money is the design of a strap to make handling of large cases easier and to prevent these cases from tipping or spilling. This solution was generated during the first half of the program but had not been implemented after eight months of red tape. Workers expressed frustration over how long it took to get things done.

Movement in Productivity Variables

Table 2 indicates the direction of movement of the six productivity indicators which were tracked during the program. As demonstrated in

Table 3, measurements were collected for both the experimental and the control department for a year prior to and subsequent to the program start-up. Regression lines were calculated for both departments during the pre and post time periods. Although there are not enough data points for rigorous time-series comparisons of the two departments, a visual scan of the charts shows a slightly more positive set of trends in the experimental than in the control unit.

Within the experimental unit, the trends for the pre and post data were statistically compared using a test suggested by Armenakis and Feild (1975). Variances of the data points around a single linear trend line are compared with variances around separate pre and post trend lines to determine whether a single line or two different lines better describes the data. The test reveals a significant F-value for all 6 productivity indicators indicating that the data points are better described by two trend lines. Increasing post trends are evident in the throughput variable. All other variables showed a slight decreasing trend. Although this test suggests that there was some improvement in productivity, there is no way to determine whether it is related to the circles program or to the increase in work volume. Nevertheless, it is possible to say with some certainty that the implementation of this circles program did not negatively impact productivity, even temporarily.

Changes in Attitude Data, Experimental vs. Control

Table 4 illustrates the results of attitude survey data at three points in time for ten attitude areas that might be expected to be impacted by a Q.C. program. A repeated measures analysis of variance test was used to determine whether there is an interaction between time

and group which would indicate that the experimental and control group scores acted differently across time (Nunally, 1975). The scores in the experimental unit did not change much during the 15 month period. Some scales went up slightly, but most dropped off to some extent. The scores in the control unit dropped off relatively strongly, however. This resulted in significant interaction effects ($p \leq .10$) in the following areas: Feeling informed, Feedback from Supervisors and Manager, Problem-Solving and Decision Making Involvement, Teamwork, Belief in the Human Orientation of the Company, and External Turnover Intent. There was no difference between groups and little change in either group in the area of Trust or Intrinsic Motivation.

It is important to keep in mind that the decrease in the control unit scores may be the result of disruption due to the physical expansion of the unit. Interviews suggested, however, that the rapid company expansion was causing quite a bit of disruption throughout the warehouse complex. The relative stability of scores in the experimental unit may indicate that the circles program helped buffer the unit from this disruption.

Changes in Attitude Data, Participants vs. Non-Participants

Table 5 illustrates the results of changes in attitude scales for three groups of employees in the experimental unit: (1) Those who did not participate in a circle during either rotational period (never); (2) Those who participated in only one or a part of one rotational period (some); and (3) Those who participated during the entire duration of the program (continuous). Respondents who were in the unit for the entire time and who responded to both the first and the last survey administration are included in the analysis. Some differences between

these three groups of people are apparent. In particular, employees who were involved during the entire program increased on measures of problem solving and decision making involvement, feedback from the department manager, trust, belief in the human orientation of the company, and declined in their turnover intent in comparison with those who had partial or no involvement. The groups which had partial or no involvement in the program declined substantially in attitudes. This pattern of attitude change supports the model portrayed in Diagram B, which predicts attitudinal improvement as a result of participation in a circle.

Interviews with those who dropped out of the program indicated disillusionment with the pace of the program, with the lack of accomplishments and with what they perceived to be time-wasting by fellow team members. Those who joined a circle during the second rotational period arrived with very high expectations. Many of them were quickly disillusioned by the slowness and difficulty of problem-solving, and there was a high drop-out rate during the second rotational period. The individuals who never participated expressed the feeling that the circles were interfering with their own ability to influence the department. These were in some cases high seniority workers who were experiencing a decline in informal status.

Table 6 examines the attitudes of department members toward the circles program at the rotational period (February, 1981) and at the end of the evaluation period (September, 1981). The results at the interim survey administration indicate that those who had been in a circle were significantly more positive in their perceptions of the program and their degree of involvement in it than those who were not in a circle.

Those with continuous program involvement at the end of the evaluation period were more satisfied with almost all aspects of the program than were either the partial involvement or no-involvement department members. Continuous-involvement individuals were _less_ satisfied, however, with management responsiveness and with the rotational system. The same patterns emerged in the interviews.

Qualitative Findings

The quantitative results reported above suggest that there was little impact on productivity and on attitudes in the department as a whole. The lack of dramatic movement in either outcome area in the experimental unit is contrasted with a drop-off in both productivity and attitude measures in the control department. It is possible that the circles program blunted the effects on the experimental unit of rapid growth and increase in workload in the warehouse as a whole. The nature of the ideas and the number of ideas which were implemented were insufficient, however, to result in a significant improvement in productivity or attitudes (Diagram A). One worker said, "We didn't work on anything that made a difference in what we have to face day to day." The department manager was blunt about productivity: The circles dealt with areas of minor significance in the overall warehouse operations. They were "paper savings." Why was this the case?

Qualitative observations and interviews suggest several explanations. First, there was no noticeable improvement in the level of group functioning during the ten months; nor was there indication that systematic problem-solving techniques were being followed. Groups tended to recycle into brainstorming whenever they ran into difficulty or the tempo slowed. Members expressed impatience, both during meetings

and in interviews, with the record-keeping and follow-up steps required
to bring ideas to fruition. Furthermore, we observed the manager and
supervisors subtly but steadily steering the group away from issues and
concerns which would have represented a serious challenge to the status
quo or a meaningful change in the work area, such as inequities in work
load and inefficient division of labor. The skills and strategy applied
by at least two of the groups did not result in the identification of
key department problems, the generation of solutions and/or the
successful implementation of solutions. Implementation of several
solutions generated by the more successful groups was delayed while the
ideas went through bureaucratic channels, resulting in worker
perceptions of low management commitment.

There is some indication that the energetic and continuous partici-
pants did experience attitudinal gains as a result of their partici-
pation (Diagram B). Those who did not find group activity satisfying
tended to drop off, leaving individuals who enjoyed the group and the
problem-solving activities. Those who stuck with it reported
satisfaction with the recognition received from the department manager
and feelings of accomplishment when they generated ideas. There is
little evidence, however, that this enthusiasm translated into greater
on-the-job effort or job performance. Department management did not see
a transference of the program enthusiasm to primary-job duties. In
fact, many of the active participants began to discuss how to get into
the supervisory ranks and seemed less satisfied than before with their
primary job responsibilities. This is not surprising. Increases in
motivation would largely be directed to the task that brought the valued
outcomes. In this case, these individuals became more motivated to

spend time in circle activity because it brought them satisfaction, but they did not become more intrinsically motivated by their main job.

During the last two months of the research, some active participants expressed declining satisfaction with circle participation for three reasons: (1) they sensed the decrease in management enthusiasm; (2) they felt that they were being inequitably recompensed for generating money-saving ideas for the company; and (3) they didn't feel that what they were doing was making an impact on their worklives. Some non-participants expressed dissatisfaction because the attendance of their co-workers in meetings was causing more work for them; furthermore, they did not see results which would warrant that sacrifice.

By autumn, the number of circles had been reduced to two, that rarely met despite the fact that they were composed of members who had been steady contributing participants up to that point. Individuals simply weren't experiencing outcomes which they valued. Nevertheless, they continued to express a desire to have a participative process to allow worker input into department decisions.

CONCLUSION

The company which hosted and supported this research intended the pilot to generate learning about quality circles as a mechanism for employee involvement and about the variables which can disrupt the intended flow of events and processes. Although the difficulty and challenge of making employee involvement a living concept became apparent, the company has begun experimentation in other departments with new resolve and new designs. Eventually it hopes to arrive at an approach which fits the technology, environment, and workforce. The program is not viewed as a failure. Some money saving ideas and worker

enthusiasm was generated. The company now knows that many employees do desire a greater impact on their work setting. They are prepared to grapple with the contextual and design issues involved in stimulating, nurturing and institutionalizing employee involvement.

Many companies are adopting quality circles programs based on a press which reports testimonials of favorable impact on productivity and worker morale. While this paper examined only one such program, it is clear that the analysis of the program impact must go beyond superficial reports of accomplishments and worker enthusiasm for the process. The causal links between the establishment of circle activity and the ultimate outcomes are tenuous and dynamic. There are many contextual and design variables which can intervene in the process and negate the intended effect. In particular, it is important to get beyond enthusiasm over participation as a concept and to examine whether this form of participation is a route to valued individual and organizational outcomes. This study suggests that attitudinal improvements as a result of direct Q.C. participation may not be accompanied by improvement in productivity and attitudes of the workforce as a whole. Much more longitudinal research on quality circle programs and other forms of employee participation is necessary to produce a literature which provides organizations with guidance as to how to accomplish goals through the vehicle of employee participation.
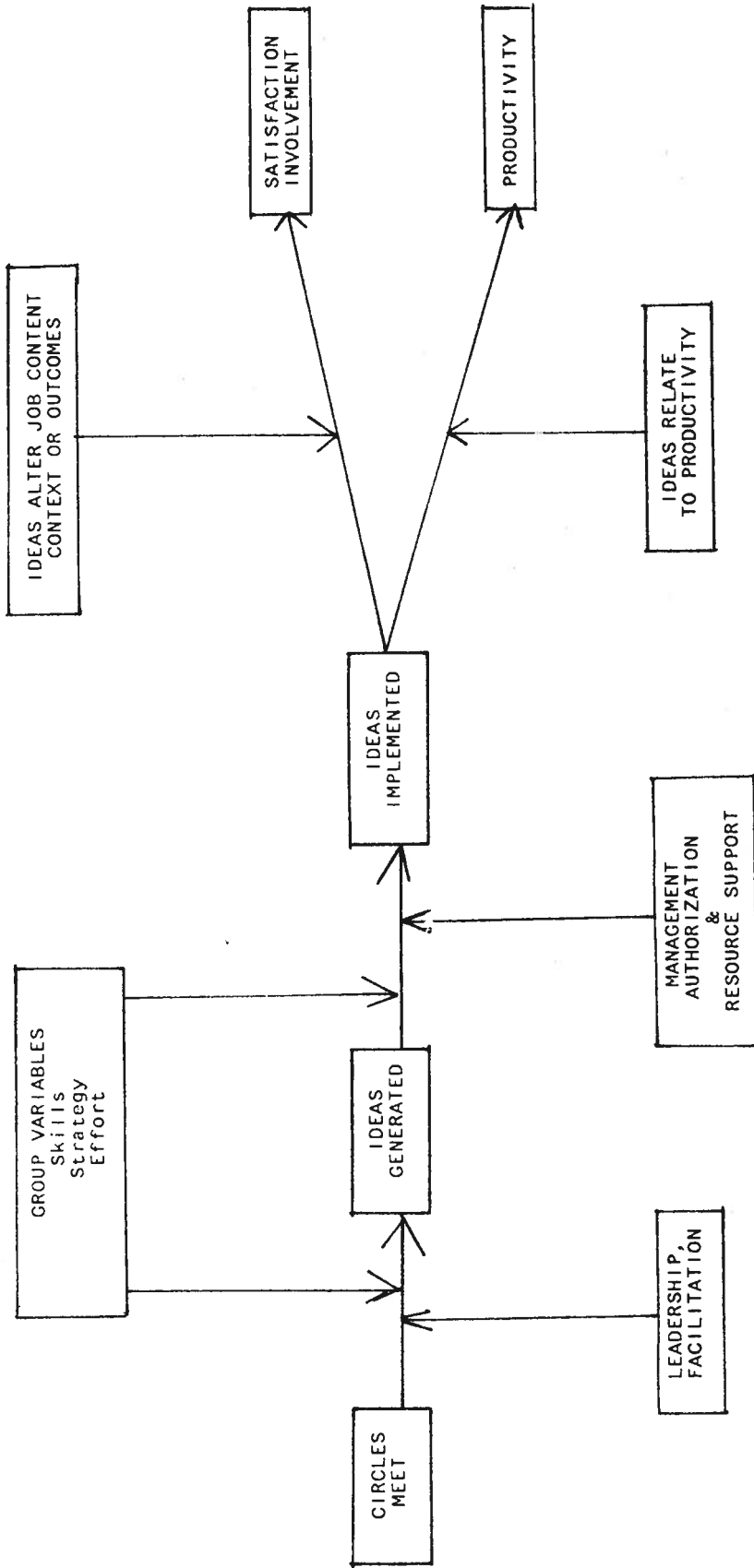
Diagram A
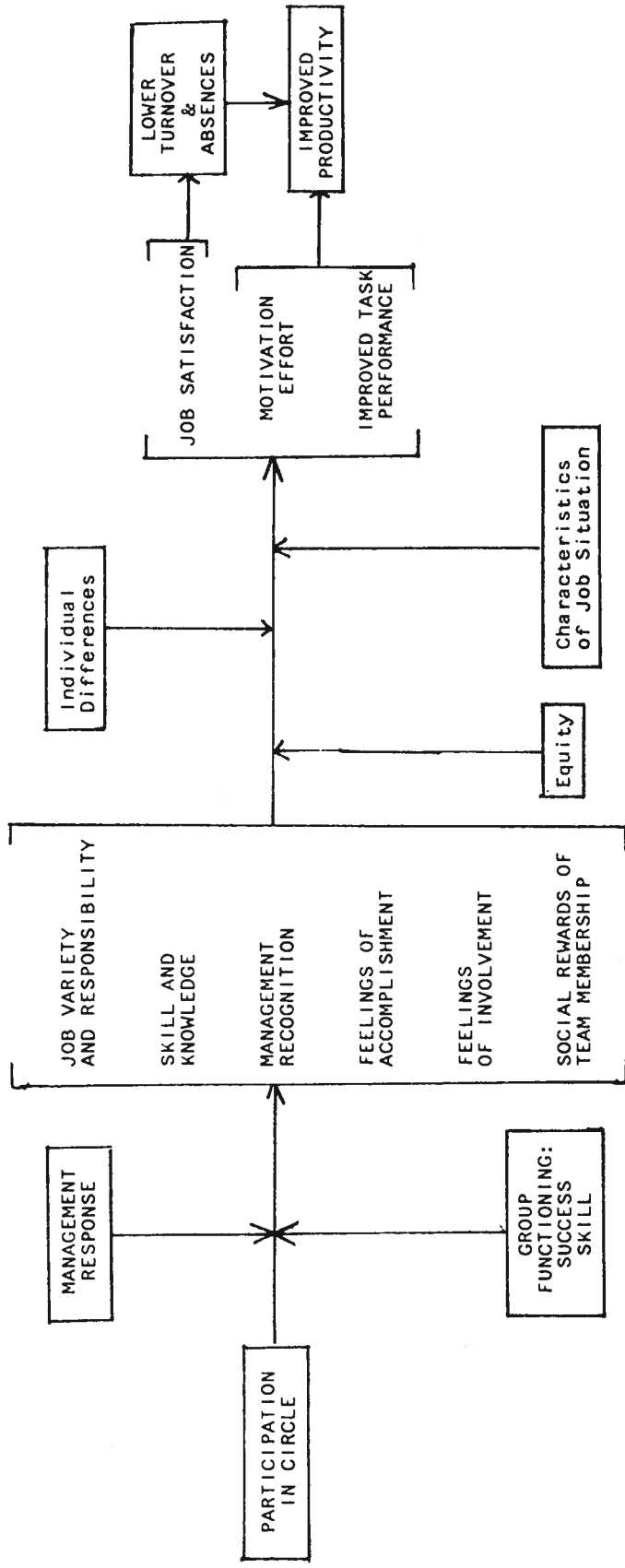
IDEAS LEAD TO PRODUCTIVITY AND SATISFACTION

Diagram B

The Quality Circle Process Results in Productivity and Satisfaction

Table 1
Examples of Achievements Reported by Problem
Solving Teams

ACTION	STATUS	ESTIMATED SAVINGS
Maintain an inventory of jackets and gloves given employees--"lost" jackets, employee to pay 50% of new jacket	3-17 On-going as of 10-81	Cut cost of jackets and glove inventory (no dollar amount given)
Camera system to give panel operator a better view of automated operations	8-81	Reduced damage and improved safety
Include maintenance and panel operator in department manager meetings	On-going--twice as of 10-81 (since 4-81)	Improved communications
Assign employee to perform daily maintenance checks	4-81 Reassigned to regular job 6-81	None given
Change tires on loading tugs to a softer rubber for better traction	As of 10-81 experimenting with different wheels started 5-81	Increased productivity and safety
Mark dock for proper cart placement to decrease congestion	Start experiment with tape 4-1 Completed 10-81	Increased productivity (no dollar amount given)
Develop a training manual	Not completed 2nd draft started 1-81	(None given)
Diverter guides on the main infeed to prevent jamming up and spilling	Installed 3-20	Reduced damage (no dollar amount given)
Catwalk and platforms around automated equipment	4-1	Improved safety
Rubber strap to replace the plastic tape on carts	As of 10-81 approval has been received. Project started 2-81.	$150,000/year in damaged merchandise

Table 2

Productivity Indicators: Experimental Unit

Indicator	Computation	Result during Implementation*
THROUGH-PUT	Total number of cases received and shipped divided by the total number of paid hours.	Slight increase
COST PER CASE SHIPPED	Total number of cases shipped divided by the total number of labor hours.	Slight decrease
PERCENT ABSENTEEISM	Full day absences divided by the total scheduled work days.	No visible change
PERCENT LABOR EXPENSE	Labor expense divided by total cost of cases shipped.	Slight decrease
PERCENT OVERTIME	Overtime hours divided by the total number of hours worked.	Slight decrease
ACCIDENT RATE	Number of accidents times 1 million, divided by the total number of hours worked.	Slight decrease

*Note: Using the regression technique suggested by Armenakis and Field (1975), the F-ratio comparing pre and post trends is significant (p 05) for each of the 6 indicators

TOTAL CASES SHIPPED FOR TOTAL PAID HOURS.
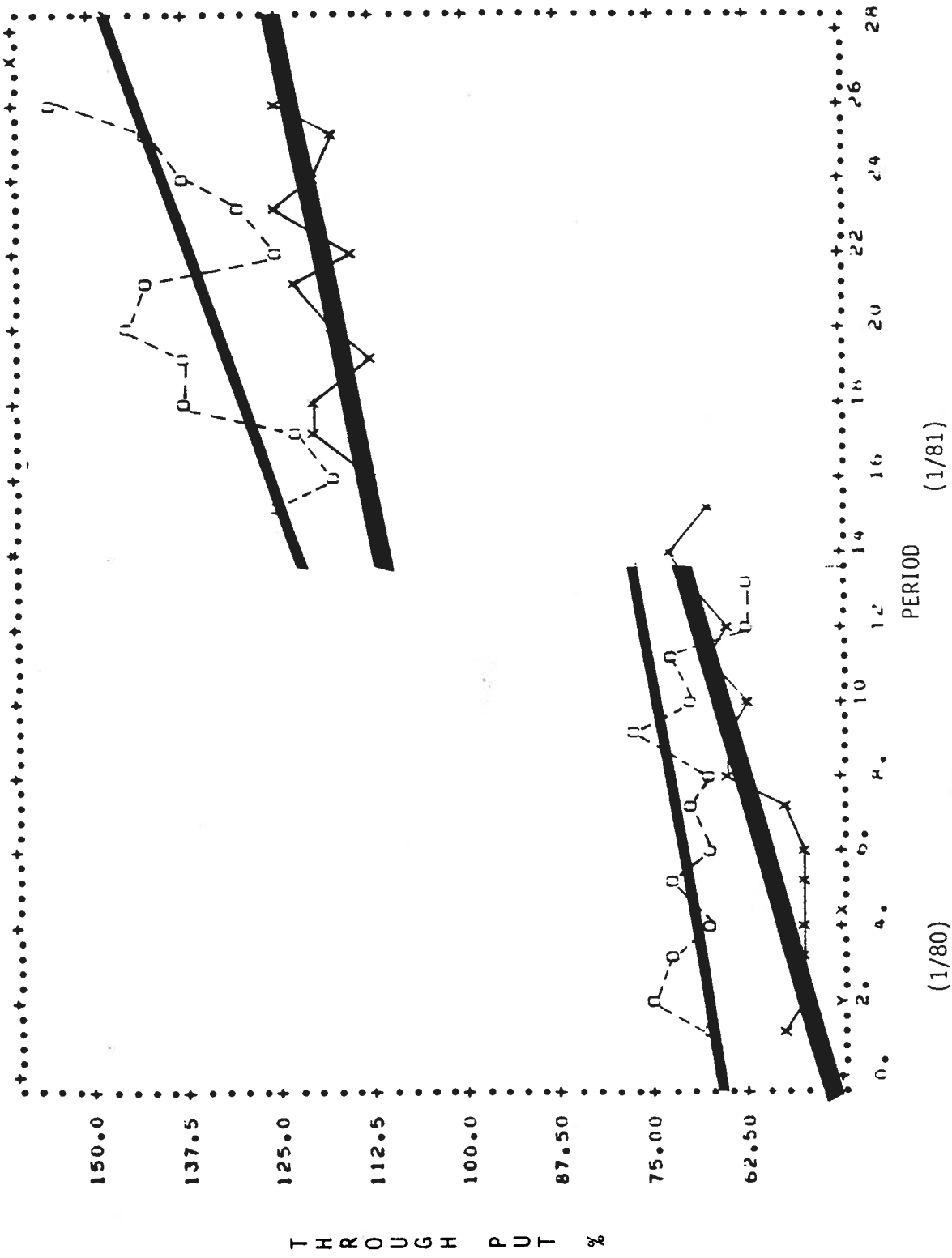
Table 3

CONTROL
X———X

EXP.
O————O

Table 4

Measures of Program Impact: Experimental vs. Control Department
(E vs. C)

REPEATED MEASURES ANALYSIS OF VARIANCE

(Scale Name and alpha coefficient)		Mean Scores* T_1	T_2	T_3**	Statistical Interaction Effect? (p≤.10)
Feeling Informed(.70)	E	4.7	4.4	4.4	yes, p=.02
	C	4.6	4.9	4.0	
Feedback From Supervisors(.88)	E	4.4	4.1	4.2	yes, p=.03
	C	4.4	4.7	3.4	
Feedback From Department Manager(.79)	E	4.1	4.2	4.4	yes, p=.00
	C	4.8	5.1	3.7	
Problem-Solving Involvement(.85)	E	4.1	4.0	4.2	yes, p=.07
	C	4.3	4.5	3.9	
Participation in Decision Making(.77)	E	3.9	3.3	3.5	yes, p=.06
	C	3.4	3.8	3.3	
Teamwork(.83)	E	4.9	4.6	4.8	yes, p=.06
	C	5.2	5.2	4.6	
Trust (.71)	E	4.1	4.4	4.2	no
	C	4.4	4.8	4.4	
Intrinsic Motivation(.83)	E	6.0	5.8	5.6	no
	C	6.0	6.1	5.8	
Human Orientation(.61)	E	4.8	4.6	4.5	yes, p=.01
	C	5.1	5.3	4.1	
External Turnover Intent(.84)	E	3.2	2.9	2.6	yes, p=.02
	C	2.4	2.4	3.0	

*Scale Range = 1-7, higher score in direction of more of scale concept
**T_1 = July 1980; T_2 = February, 1981; T_3 = September, 1981.

Table 5

Measures of Program Impact on Individuals with Various Participation Levels
(Experimental Department Only)
ANALYSIS OF VARIANCE

Total = entire groups
All = continuous participants
Some = some participation
None = never participate
T3 = September, 1981

T1 = July 1980
T3 = September 1981

Mean Scores (Scale = 1 - 7)

Scale name and (Coefficient Alpha)		(N=32) Total	(N=7) Never	(N=10) Some	(N=15) Continuous	Significant Interaction Effect
COMMUNICATION AND INFORMATION						
Feeling Informed (.70)	T1	4.6	4.4	4.6	4.7	no
	T3	4.3	4.3	3.7	4.6	
Feedback from Supervisors (.88)	T1	4.4	4.7	4.3	4.3	no
	T3	4.4	4.8	3.7	4.0	
Feedback from Department Manager (.79)	T1	4.1	5.1	4.2	3.8	yes (p=.06)
	T3	4.4	4.8	3.5	4.8	
INVOLVEMENT IN PROBLEM SOLVING AND DECISION MAKING						
Problem-Solving Involvement (.85)	T1	4.1	4.8	4.2	3.8	yes (p=.003)
	T3	4.0	3.1	3.6	4.6	
Participation in Decision Making (.77)	T1	3.8	3.4	4.0	3.8	yes (p=.08)
	T3	3.5	3.0	2.9	4.0	
Teamwork (.83)	T1	4.9	4.9	5.0	4.9	no
	T3	4.8	4.6	4.3	5.1	

Table 5 (Cont'd)

Scale name and (Coefficient Alpha)		(N=32) Total	(N=7) Never	(N=10) Some	(N=15) Continuous	Significant Interaction Effect
AFFECTIVE REACTIONS						
Trust (.71)	T_1	4.4	4.9	4.6	3.8	yes (p=.04)
	T_3	4.2	4.5	3.7	4.6	
Intrinsic Motivation (.83)	T_1	6.0	6.1	6.3	5.8	no
	T_3	5.6	5.5	5.6	5.6	
Belief in Human Orientation of the Company (.61)	T_1	5.0	5.9	4.9	4.5	yes (p=.004)
	T_3	4.4	4.1	3.8	5.0	
WITHDRAWAL						
External Turnover Intent (.84)	T_1	2.8	2.0	2.1	3.8	yes (p=.003)
	T_3	2.8	3.0	3.1	2.4	

TABLE 6
One-Way Analysis of Variance Comparing
Attitudes Toward Problem

Solving Teams (IT program)

	Time 2, Mean Scores	
	Non-participants	Participants
a. The amount of information you receive about what is going on in the IT groups (If you are a group member, how satisfied are you with information you get from the other groups?)	3.3	4.9***
b. Your degree of involvement in the program	3.7	5.6***
c. Management's responses to worker concerns	4.5	4.9
d. The pace at which the program is moving along	4.1	3.9
e. The extent to which your views are being represented	4.0	4.7 *
f. The IT program in general	4.7	5.4 *
g. The IT member rotation process	---	---

	Participation measured at time 3		
	Never	Some	Continuous
	(N=7)	(N=10)	(N=15)
a. The amount of information you receive about what is going on in the IT groups (If you are a group member, how satisfied are you with information you get from the other groups?)	4.0	4.1	5.1
b. Your degree of invovement in the program	4.0	4.8	5.4 * (Never vs. continuous)
c. Management's responses to worker concerns	5.0	4.2	4.6
d. The pace at which the program is moving along	4.4	3.9	4.7
e. The extent to which your views are being represented	4.4	4.6	5.2
f. The IT program in general	4.4	4.6	5.3
g. The IT member rotation process	4.6	4.7	4.2

* p .05, *** P .001
(Scale: 1 = strongly dissatisfied
7 = strongly satisfied)

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