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Assessing if Quality Circle Problem-Solving Techniques Affect the Quality of the Instructional Teams at Millard North Junior High School

Hannelore Sander Jasa
University of Nebraska at Omaha

ASSESSING IF QUALITY CIRCLE PROBLEM-SOLVING TECHNIQUES AFFECT THE QUALITY OF THE INSTRUCTIONAL TEAMS AT MILLARD NORTH JUNIOR HIGH SCHOOL

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by

Hannelore Sander Jasa

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

FIELD PROJECT ACCEPTANCE

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Supervisory Committee

Name	Department
Edward Fadler	TED
Katherine Foster	Ed. Administration

Darrell Kellams
Chairman

4/4/85
Date

DEDICATION

I would like to dedicate this research to my family, for without their inspiration and encouragement I would not have pursued my career to this extent. I would also like to express my appreciation to Dr. Kellams, Dr. Petrie, and Dr. Kasten for their patience, guidance and direction throughout the development of this study. A special thank you goes to my husband and children, whose understanding and love were most important.

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CHAPTER I

INTRODUCTION

Although Quality Circles have existed for over twenty years, they are presently enjoying the greatest level of interest since their advent. Today, the nature of work in America is changing rapidly. American workers are demanding more voice in matters relevant to their work and many managers are realizing the overall value of multi-level participative management. Workers are often asked to share their observations with team leaders, and supervisors are seeking new techniques for increasing the efficiency and profitability of the work place.

In a Quality Circle program, groups of employees who perform the same work or share the same work area meet on a weekly voluntary basis to analyze and solve work related problems. With training and guidance, the circle members learn to apply statistical techniques and tools to problems affecting their work in order to make performance more efficient and productive. Subsequently, solutions and recommendations are presented to the management for approval, authorization, and implementation.

The humanistic approach to work organization has increased in popularity during the last decade. Although "quality of working life" bears a resemblance to previous humanistic endeavors, it also bears many unique

characteristics. In Freedom Inside the Organization: Bringing Civil Liberties to the Work Place, David Ewing, instructor at the Harvard Business School, develops the notion that the newest rights battleground is the work place and criticizes what is termed the "outmoded law of employer chauvinism."[1] He suggests that the struggles for values have been won in the legal, political and social arenas, and that the time has come for bringing mutual respect into the work place.

Quality Circles are structured to encourage workers to take the initiative rather than merely reacting to the proposals of management, and within the last few years the concept has moved from industrial settings to banks, hospitals, government, and service organizations. Now, the Quality Circle concept has found its way into the educational system. It is a fact that education has borrowed models, values, and concepts from the business world.

> The concepts of efficiency, economy, accountability, competency, and productivity have wide currency in education...Educators have subsequently been exposed to the human relations movement, accountability, human resource development, organization development, and M.B.O." 2

School administrators utilize many of these management concepts to develop and attain short and long term goals.

Many educators feel it is now feasible for Quality Circles to thrive within the American public school system. Teachers and administrators are discovering that Quality

Circle techniques are not only exciting and challenging, but rewarding and productive as well.

> With flexibility and collaboration and by utilizing teacher-management groups, work can be redesigned, sticky questions having to do with class size, paraprofessional roles, response to communities, curriculum and the like can probably be dealt with more efficiently than under present arrangements. 3

Quality Circles provide a structured avenue whereby routine problems can be identified, analyzed and dealt with before they have the opportunity to become major problems.

Researching the Quality Circle concept within the framework of education is intriguing because not only are there relationships between the executive managements and the employees, and between school administrators and the teachers, but the obvious parallels follow through for teachers and the students. Motivating and stimulating the various groups toward productivity are common goals, and interfering barriers of alienations, hostility and ignorance need to be overcome. By examining the relationships between the Quality Circle concept and educational goals, it is very possible that a common purpose can be determined and positive behavior changes can be developed within the school setting.

In 1972, the Millard Public Schools in Omaha, Nebraska, adopted a junior high organizational pattern which included interdisciplinary team teaching. This plan was utilized at Millard Central Junior High School and Millard North Junior High School by the 1973-1974 school year.

Ira Singer defined team teaching as:

> An arrangement whereby two or more teachers cooperatively plan, instruct and evaluate one or more class groups in an appropriate instructional space and given length of time, so as to take advantage of the special competencies of the team members. 4

The school-based interdisciplinary team may also provide greater assessment accuracy, a forum for the exchange of ideas, and resources for developing and evaluating innovative programs.

There are currently eight interdisciplinary teams at Millard North Junior High School. Team meetings are attended by one administrator, one counselor, and one teacher from each of the core departments (English, science, math, social studies). Additional staff members such as the school psychologist, the school nurse, a special education teacher or a teacher from an elective department may occasionally be asked to assist. If needed, parents or an outside social agency may also be called upon to attend team meetings.

Team members are given one fifty minute period each day for planning purposes. Usually, a team will meet formally twice a week, once under administrative direction. A flexible weekly agenda is cooperatively planned a few days before each meeting, and members are free to communicate their concerns and views.

STATEMENT OF THE PURPOSE

Evaluation of any program is essential to the development or continuation of that program. The purpose of this field project was to determine if Quality Circle problem-solving techniques affect the quality of the instructional teams at Millard North Junior High School.

DELIMITATIONS

This study was limited to the staff at Millard North Junior High School in Omaha, Nebraska. The investigator did not attempt to explore the merits of team teaching as opposed to traditional methods. The investigator also did not attempt to relate Quality Circles to school effectiveness. It should be noted that Quality Circle implementation requires at least a full year for training development, analyzation, planning and presentation. It may then take many more months before evaluations and follow-ups can be made. Since this field project had to be completed within a time framework, the study focused on a limited area of Quality Circle problem-solving techniques. Also, since the Quality Circle concept emphasizes that all participation should be voluntary, the writer had no influence on who participated.

ASSUMPTIONS

The emphasis on the Quality Circle concept within

education makes a number of assumptions.

1. There is an assumption that the collective talents of a number of autonomous individuals who work together can be more valuable to the organization and produce more quality outcomes as a team than from the isolated efforts of individuals.

2. There is an assumption that those who work in a particular sphere are the experts and that their effectiveness is increased particularly when one can train that expertise and direct it into mutually desirable directions.

3. There is an assumption that there are some transferable skills to be gained from the training of personnel in problem identification, analysis and resolution in group context. These skills may be directly or indirectly applicable to the work setting or classroom or to the personal lives of participants.

4. There is an assumption that when individuals take part in the decision-making that relates directly to their own work situation, there tends to be more job satisfaction and, therefore, a higher degree of productivity and unity of goals within the organization. 5

HYPOTHESIS

It was hypothesized that the implementation of Quality Circle problem-solving techniques at Millard North Junior High School would yield no differences in instructional team effectiveness.

METHODOLOGY TO BE EMPLOYED

With the desire to professionally assess if training in Quality Circle problem-solving techniques affected the quality of the instructional teams at Millard North Junior

High this study: (1) reviewed the pertinent literature concerning Quality Circles in education; (2) developed and distributed a pre-questionnaire to assess the staff's attitudes towards team decision-making and problem-solving; (3) involved volunteer instructional team members in a Quality Circle problem-solving techniques inservice; (4) developed and distributed a post-questionnaire to the inservice participants; (5) described the findings from the questionnaires; (6) summarized, concluded and made recommendations.

DEFINITION OF TERMS

For the purposes of this study, the following definitions apply:

Quality Circle. A participative management tool designed to systematically harness the brainpower of employees to solve an organization's problems of productivity and quality.

Millard North Junior High School. One of two junior high schools in the Millard School District in Omaha, Nebraska. Millard North Junior High School includes students in grades seven and eight. The building utilizes an open design and has implemented eight interdisciplinary teaching teams.

Interdisciplinary teams. An instructional organization in which a group of students is assigned to a group of teachers who are jointly responsible for the instruction of

that same group of students. The teams in this study were composed of four teachers from the fields of English, social studies, math and science.

Readiness. The quality of being prepared or equipped to implement Quality Circle problem-solving techniques to team members.

Implementation. To provide the means whereby the Quality Circle problem-solving techniques can be carried out by the team members.

Attitude. A disposition or feeling toward participative problem-solving as measured by the post-questionnaire.

ORGANIZATION OF THE PROJECT

Chapter I - Introduction

Chapter II - Related Literature

Chapter III - Methodology

Chapter IV - Presentation of Findings

Chapter V - Summary, Conclusions, and Recommendations

CHAPTER II

A REVIEW OF PERTINENT LITERATURE CONCERNING QUALITY CIRCLES IN EDUCATION

Today our nation faces serious economic problems because of high production costs and foreign competition. Over the past two decades, the United States has lost market shares and many foreign nations have surpassed the U.S. average annual productivity growth rate. However, as U.S. productivity has declined, Japan not only has seized the lead in manufacturing output per hour, but the quality of their products has also become superior. What did Japan do to achieve this undisputed number one place? Japan adopted a six-point program to maintain a quality image. The six-point program includes the following:

1. Quality audits
2. Nation-wide promotion for good quality
3. Quality training
4. Use of higher statistical methods
5. Nation-wide quality control activities
6. Quality circles[6]

It is estimated that Japan saves between twenty and twenty-five billion dollars every year as a result of the creative activities of the Quality Circles.[7] The Japanese believe that by respecting the brainpower of fellow human beings, problems can be identified and solved economically and efficiently.

The growing demands and expectations of the work force must be dealt with in a cooperative approach. Workers and supervisors, subordinates and managers, must work together in order to enable people to participate in improving their jobs. This builds pride and a sense of organizational belonging.

Quality Circles recognize and tap the intellectual potentials of employees. Quality Circles provide training and opportunities for people to become actively involved in an interpersonal process of joint problem-solving. Not only are costs reduced, but employees are provided with opportunities for personal growth and development, self-respect, and job achievement.

What is a Quality Circle? It is a group of four to ten employees who have similar organizational goals. This group of volunteers meets regularly on company time to identify the causes of on-the-job problems and to propose solutions to management. Once a week, under the structured supervision of a team manager, members employ advanced problem-solving techniques to solve organizational problems of productivity and quality. Workers are encouraged to "take the initiative rather than merely reacting to proposals."[8]

In order to promote profitable operations during this period of economic stress, managers may have to alter their styles. Participative management has helped businesses operate successfully and profitably despite inflation,

recession, and other economic problems. Tracing the history of managerial theory briefly will highlight the emergence of the Quality Circle technique.

History of Managerial Theory

Around 1900, Frederick Taylor showed how to improve productivity by standardizing jobs. Then there was an era of time and motion studies to refine jobs and increase output. The emphasis was placed on the jobs themselves, and little or no attention was given to the workers. The formation of unions was a reaction to this. Following World War II, behavorial scientists became deeply involved in the management process. According to Abraham Maslow's Hierarchy of Needs, the key to motivating workers to perform to their fullest potential was to satisfy physiological needs, safety needs, social needs, egoistic needs and self-actualization needs.

Douglas McGregor formulated a group of assumptions about human nature and behavior which he called Theory X and Theory Y. Theory X proposed that the average person disliked work and responsibility and needed to be directed, controlled, and/or punished before efforts were adequate. Theory Y proposed that the average person did not inherently dislike work. Depending on controllable conditions, work could be a source of satisfaction. Workers could exhibit self-direction and self-control if external and internal rewards were realized.

Applying the work of Maslow and McGregor to the problems of work motivation, Frederick Herzberg felt it was clear that traditional methods for the division of labor used only a small portion of human potential. His Hygiene-Motivation theory proposed that the work environment (made up of hygiene factors such as pay, working conditions and hierarchical relationships) could not increase work satisfaction. Herzberg contended that working satisfaction could only be increased by motivators which were linked to individual needs, such as the need for achievement, the need for recognition by others, the need to work itself, the need for responsibility, and the opportunity for advancement.

The Tavistock Institute of London developed a theory that focused on working groups rather than individuals. Tavistock researchers discovered that workers often organized themselves into groups in order to improve economic effectiveness and the quality of work life for employees.[9] Thus, the emergence of management by participation.

After World War II, when many industries in Japan had been destroyed, Dr. Edward Deming, a statistician for the U.S. government, was sent to train management people in Japan. He professed that everyone should plan, collect data, analyze, and construct the work in order to maintain company quality. His philosophy became known as the Deming Wheel.

During 1954 to 1955, another famous consultant, Dr. J.M. Juran, visited Japan and lectured on what is known as Total

Quality Control. He contended that quality began in the design state and ended after satisfactory services were provided to the customer. It was not just the manufacturing quality one should be concerned with, but the total quality that counted for company success.[10]

The origin of Quality Circles in Japan came after the valuable training of Dr. Deming and Dr. Juran. The Japanese foremen who had received the training wondered what to do with the knowledge they had received. In 1962, small groups were formed to teach workers various problem-solving techniques. Workers shared their knowledge and expertise, and soon there were about two thousand Quality Circles in operation in Japan. In 1974, American business executives visited Japan and learned about the process and became interested in it. By the end of 1977, about fifty American companies had implemented the process and the number of Quality Circles in the U.S. rapidly accelerated.[11] The success of Quality Circles in manufacturing stirred the interest of service organizations where the people-building philosophy was popular. In recent years, hospitals, banks, public utilities, government agencies, professional associations, and educators have discovered what can be accomplished by utilizing the Quality Circle concept.

Parallels of Business and Education

American education has gone through numerous changes in outlook and methods of operation, from a fundamental religious

base to a technical emphasis to a focus on individual development. Throughout its existence, education has attempted to train each child to reach his/her fullest potential.

Although American businesses are mainly interested in profits and education is interested in people, there are many similarities. In education, the business word "productivity" is equated with "effectiveness". Just as American business and industry have seen a decline in the world market, education has faced declining student achievements. American consumers are demanding greater product quality in industry and technology and their cries are echoed by a demand for greater educational effectiveness.

One definition of effective schools are those schools which produce students who have mastered basic skills in order to progress into higher education or technical work successfully. The late Ronald Edmonds, who is credited with launching the effective schools movement, defined effectiveness as "a highly circumscribed, quantitative measure of school improvement," in which students' acquisition of basic skills would be measured by "recording the annual increase in proportionate mastery in the lowest social class."[12] The recent literature on school effectiveness concludes that differences among schools do affect students' academic achievement. Although the literature is clear about the academic achievements quality teaching can produce, there are

varied theories as to how educators should go about improving schools.

The Northwest Educational Cooperative (NEC), an intermediate school agency which serves more than five hundred midwestern school districts, searched for practical, cost-effective methods to increase school effectiveness. They identified Quality Circles as a promising method to upgrade quality, productivity and morale in schools.[13]

Quality Circles have successfully multiplied in business and service organizations, but they are more of a promise than a reality in American education.[14] If educators want to increase quality and effectiveness in America's schools, they must focus their energies on their most vital resources--the people who work in the schools.

"Quality Circles are a participative management tool designed to systematically harness the brainpower of employees to solve an organization's problems of productivity and quality."[15] Applying the Quality concept within a school setting would enable various levels of the staff to work together on mutual problems and common goals.

Educators have eagerly accepted the theory behind Quality Circles. Positive responses have come from school principals, superintendents, teachers, board members and specialists. However, few school systems have actually used the Quality Circle concept. Educators are tenatively investigating Quality Circle techniques and values to discover

if costs can be reduced and if morale and productivity can be improved. Whether or not the Quality Circle will have the same success in education as it has earned in business remains to be seen. That it is a technique worth investigating and studying is beyond question.[16]

Quality Circle Objectives

There are two major foundation blocks in the Quality Circle process. One is the frequent use of creativity whereby participants are encouraged to think and solve problems. The other is improvement in communication. Participants must constantly work to overcome misunderstandings and misinterpretations.[17]

In order to achieve success in the Quality Circle program, major objectives should be outlined. The following examples will give some ideas of the accomplishments that the groups can work toward:

1. Self-development
2. Mutual development
3. Improvement in quality
4. Improvement in communications and attitudes
5. Waste reduction
6. Job satisfaction
7. Cost reduction
8. Improvement in productivity
9. Safety improvement

10. Problem-solving opportunities
11. Team building
12. Link all levels of management and workers together to achieve success
13. Get people more involved and interested in their work
14. Improve participation
15. Reduce absenteeism and grievances[18]

A key issue in establishing Quality Circles within school systems is that the administrators trust and support the Quality Circle concept before a circle formulates its own objectives. Initially, the circle may focus on increasing the effectiveness of a department, but gradually the circle may deal with issues concerning other areas of the school.

Implementing Quality Circle programs is not easy. There are a number of frequently expressed objections. People resist change, but because the Quality Circle process involves the staff in the decision-making process, they are more likely to accept adjustments. Other people feel it will take too much time, but in reality, Quality Circles save time, work and energy. Many managers fear that they will lose their authority and control, but management will still be responsible for the final stamp of approval. Workers may not feel a commitment to help management with problems, but in actuality, they will also be improving the quality of their work life. Staunch Americans may resist the technique because it was invented in Japan, and although the cultures

are different, the philosophy of working together is universal.[19] These are just a few examples of the types of objections that may be raised, and it is important to address such objections before establishing a Quality Circle program.

Sud Ingle, a Quality Control manager for Mercury Marine, part of the Brunswick Corporation, has written an extensive Quality Circle master guide. His guidelines are frequently used by organizations implementing Quality Circle techniques. Before revealing the secrets of a successful Quality Circle program, Ingle offers a few cautions and suggestions.

He begins by stating that right conditions must be created before a suitable atmosphere for Quality Circles can be established. Management must be committed to the program and the right people must be chosen for the key role positions. Clear and realistic objectives must be selected. Employees should gradually be informed of the program through various communicative channels and participation should always be voluntary. Proper training is crucial--without it the program will undoubtedly fail. All participants must try to be open and positive, and progress or changes should be carefully monitored. Of course, there will be unforeseen risks. Appropriate actions must be taken at the right time in order to ensure that a situation does not get out of control. Early publicity should be carefully regulated, as overpublicity could hinder the program instead of helping it to get established. An overload of paperwork quickly dampens

enthusiasm, so once the program is established, the amount of paperwork should be efficiently streamlined. Finally, the philosophy that people make the program work for their benefit as well as the benefit of the organization should constantly be remembered.[20]

Once the personnel has been exposed to the technique and a commitment has been made, the organization's objectives and expectations should be clarified. At that point, an assessment of organizational needs should be made and then a personally tailored program can be developed and presented to the management for approval.

Roles and Functions of the Quality Circle

Quality Circles are not separately functioning organizations so there is no need to create new positions or form new departments. The functions of a Quality Circle should be considered as part of the normal channels of the organization which will help manage the responsibilities of the formal program.

The roles and functions of the Quality Circle organization involve an integration made up of several parts.

- The executive committee
- The steering committee (operating committee)
- Quality Circle leaders
- Quality Circle members
- The facilitator (program coordinator)

The executive committee represents the top managers of an organization who will eventually establish and approve Quality Circle policies and programs. They may give prior approval to the implementation of the technique and offer basic guidelines. Executive committee members may attend Quality Circle meetings and suggest problems for discussion occasionally. Members may also promote the benefits and advantages of the Quality Circle program to middle management.[21]

Fundamentally, the steering committee, also known as the operating committee, sets goals and objectives for the Quality Circle activities once the program has been approved and the training has started. It controls the rate of expansion and establishes operational guidelines. Representatives from major departments, the union, one of the Quality Circle leaders and the facilitator should be members. The committee is usually composed of seven or eight members and involvement and participation are encouraged. In a large organization, two steering committees may be formed; one for the upper corporate level and a lower level committee that would operate closer to the given Quality Circle activities.[22]

The Quality Circle leader is elected by the Quality Circle members. Experience has demonstrated that Quality Circle activities will have a greater chance for success if a supervisor is the initial leader. Later, another individual

may be identified to assist the leader. The leader, not the facilitator, is responsible for the smooth and effective operation of the circle. Leaders should try to involve each member as many times as possible at every weekly meeting without monopolizing the activities of the circle. Leaders are trained in the dynamics of group participation (coordination, harmony, encouragement, redirection) and are taught how to maintain records and disseminate information. Leaders may serve as links between members and the management, and they may seek the advice of the facilitator.[23]

The Quality Circle members are the most important part of the system, for without members there are no circles and no program at all. The members are the heart of the program and the proper use of their brainpower is the key to its success. Membership is voluntary and groups are formed from various areas of the organization. One of the essential key elements of the program is proper training. Members are trained in understanding the basic program concept and become familiar with the techniques. Without the necessary training, most Quality Circles are not successful.[24]

The facilitator serves as a coordinator and director of the Quality Circle activities within an organization. Their Quality Circle education is often handled by outside training institutions. The facilitator is then responsible for training the circle leaders and oversees all of the organization's circles. The selection of a facilitator is

sometimes the first task of the steering committee. Facilitators report to top management as well as entry level employees, which aides department cooperation. Obviously, the facilitator's position is very important to the Quality Circle program. The position requires that the person be educated and possess a good working knowledge of the organization. Since the facilitator must communicate and cooperate effectively with many different types of people, interpersonal human relations and public speaking skills are highly necessary assets. Usually, small organizations have part-time facilitators. In a large organization, the facilitator may have to work various shifts in order to serve all of the members.[25]

Besides possessing a thorough understanding of the Quality Circle program and an in-depth working knowledge of the organization, facilitators are responsible for the following duties:

1. Sit as an active member of the steering committee
2. Serve as Quality Circle program coordinator
3. Train members, leaders, management
4. Coordinate and support circles
5. Maintain circle records
6. Arrange meetings with outsiders
7. Attend in-circle meetings
8. Solve personal problems
9. Search for new members

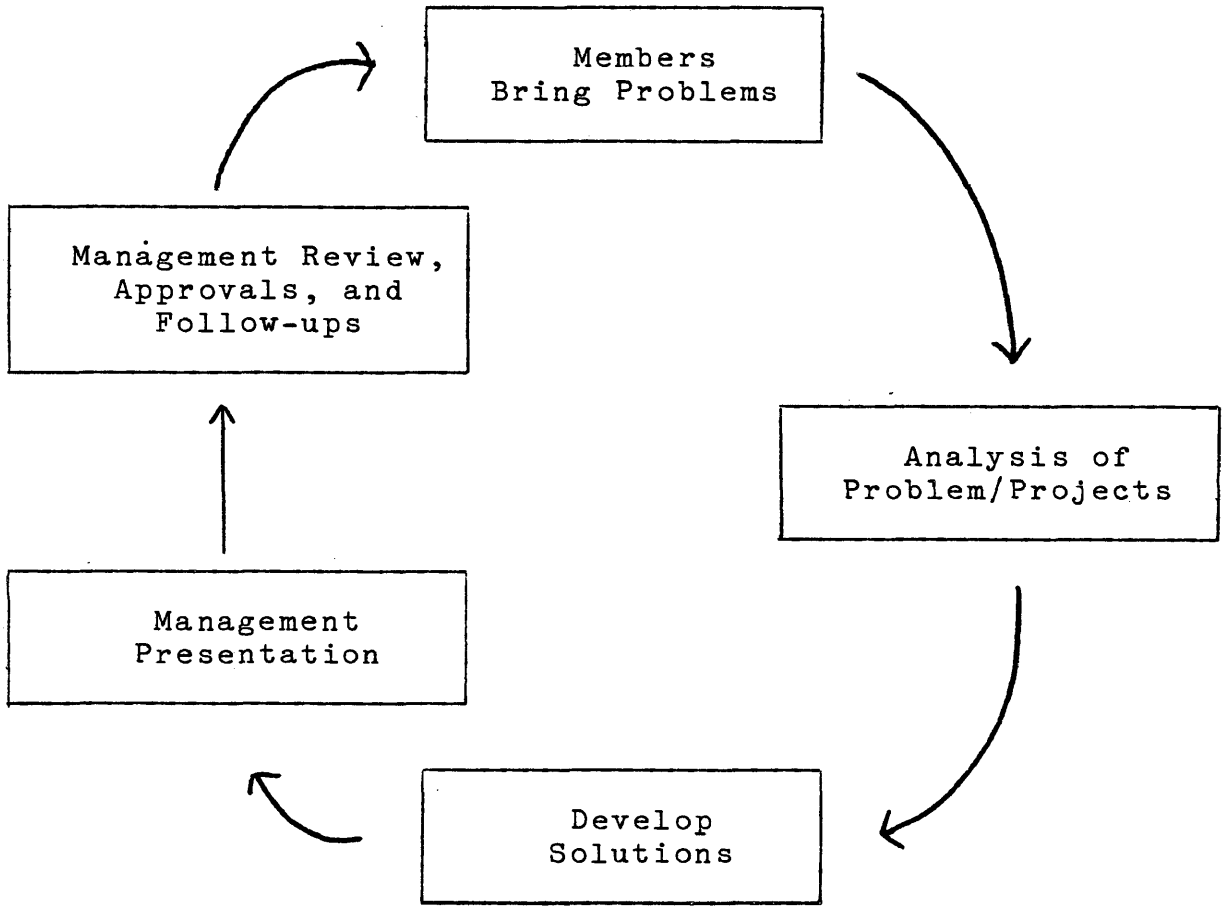
10. Search for new ideas
11. Publicize the program
12. Link all people in the organization
13. Prepare for presentations--invitations, papers, visual aids
14. Prepare new training material
15. Follow up on completed projects
16. Attend conferences
17. Read outside materials
18. Organize informal gatherings--invite outside speakers 26

The work and job of the facilitator is vital and very important. Problems of differing personalities, opposing opinions, loss of enthusiasm and administrative indecision are to be expected and handled sensitively by the facilitator.

The Quality Circle Process

The Quality Circle process consists of problem identification, problem analysis, problem solution, and a recommendation to the manager (administration). The goal is to recommend specific methods for improving work effectiveness. The following diagram gives an overall 27 picture of circle operation.

Figure 1



At the first meeting, the circle may decide to identify a list of problems the members wish to study. To master the circle process, members are guided by the leader through seven circle techniques: structured brainstorming and voting; data gathering; statistical check sheets; Pareto analysis; fishbone cause-effect analysis; process cause-effect analysis; and presentation.

Structured brainstorming is a method of eliciting a free flow of ideas from a group to solve a problem. Circle members learn the DOVE guides for brainstorming:

- Do not judge ideas.
- One person in turn.
- Variety in thinking is important.
- Energize the group with creative thoughts.[28]

The purpose of the brainstorming session, which is used in every step of problem-solving, is to produce a large quantity of ideas before narrowing to the best ideas. Members take turns contributing ideas and the responses are recorded.

There are two levels of voting in this process. During the first vote, circle members vote an unlimited number of times on any ideas which may warrant further consideration. The number of votes per idea are reorganized according to priority. Next, group members discuss the ideas to clarify individual interpretations. Subsequently, another vote is taken. Typically, for every five ideas listed, one vote per member is allowed. Through this process ideas are reordered and effectively prioritized.[29]

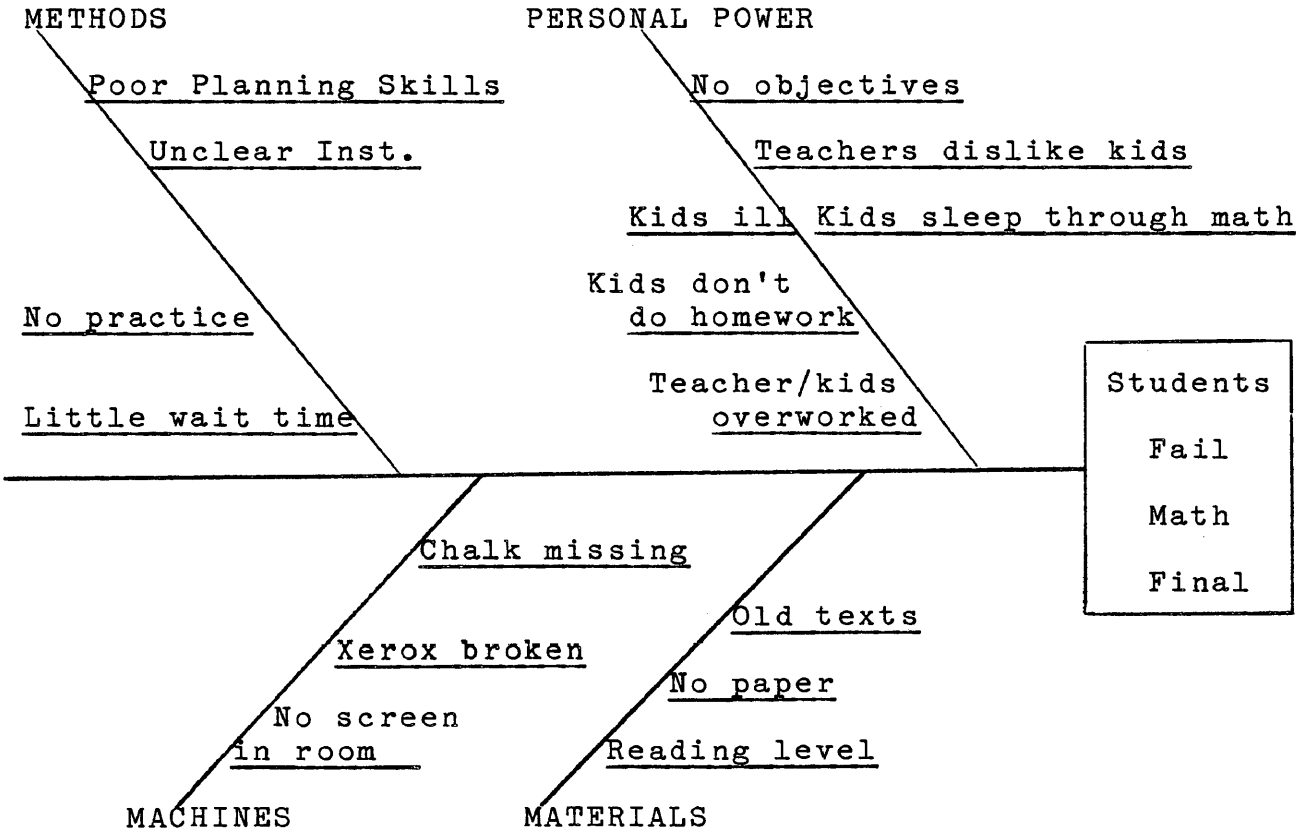
Based on this technique, members can decide which problems should be worked on. In some cases, problems might be so obvious that collecting and analyzing data will be kept at a minimum. It is wise for the Quality Circle members to take precautions so that the circle does not waste its time on minor problems or on projects where solutions are already in progress.[30]

There are many cause-and-effect analysis systems. Each provides a stucture whereby a "true" cause of a particular

problem can be identified. The method most often used in Quality Circles is the fishbone technique.

The fishbone cause-effect analysis, developed by Professor Kaoru Ishikawa of the University of Tokyo in the early 1950's, combines brainstorming and voting to discover and repair the reasons for failure.[34] A chart, which in its final form looks like a fish, is constructed to speed the discussion of four standard sub-areas: manpower, machinery, method, and material. Possible causes of the problem will usually fall into one of the four areas. The following fishbone diagram gives a sense of the way data is organized by this structure.[32]

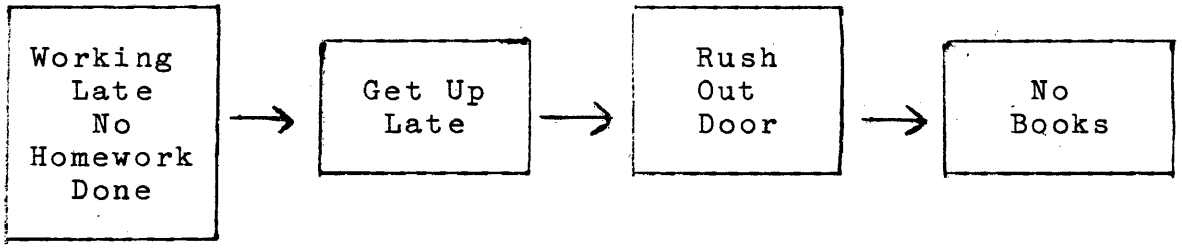
Figure 2



If it proves that the circle has isolated the key cause, members proceed further to seek the solution. However, if the data do not show sufficient evidence, new data from another possible problem cause must be collected.

Another analysis which may be used is the process cause-effect analysis. In this method, members work backward from a problem to its cause in order to see where the breakdown may have started. The following example illustrates this method.[33]

Figure 3



Other cause and effect formats include work flow analysis, force field analysis, job target analysis, and so forth. "Before a cause-and-effect analysis tool is adopted by a circle, group members must be thoroughly trained in the exact application of the model."[34]

In certain states of the Quality Circle process, data collection and verification become very important. Hard facts are gathered through the use of check sheets, surveys, samples, graphs, and simple statistical techniques like mean, median, range, frequency distribution, inferential data analysis, and so on.

Assignments are given to various members for the collection of data. Statistical check sheets or graphs are the first tools members learn to develop and interpret. Data is recorded to answer questions like How many? How far? How much? How long? For example:[35]

Figure 4

Case 1

A. Problem identified: Student reading levels deteriorated in 8th grade.

B. Major Causes Analyzed:

1. Entry skills are lower with more transient population.
2. Less time spent on reading skills in content area.
3. Lack of coordination among staff on remedial methods.
4. Teacher expectations are lower.

						Total
1.	Lower entry skills	xx	x		xx	5
2.	Less time spent on reading skills	xxxx xx	xxx x	xxx x	xxxx xx	20
3.	Lack of coordination	x			x	2
4.	Lower teacher expectations	xx	x	xxx	x	7

Developing and interpreting data are vital tools whereby educators can answer questions and determine alternatives based on factual evidence, and possessing a practicable knowledge of research analysis and statistics would be beneficial.

> While most educators have taken a course in statistics as part of their graduate preparation, few are truly trained at the routine application of statistical analysis technique within their own jobs. One of the spin-off benefits of quality circle involvement is the opportunity to relearn useful statistical analysis, data analysis, and data gathering methods at a practical level. 36

Cause and effect analysis provides the data necessary to determine the likely causes of a problem and the direction for data collection. Decision analysis is a "systematic procedure for reviewing the results of data gathering and verification in order to determine if the hypothetical culprit is the actual cause before solutions are considered."[37] The decision analysis method used most often by Quality Circles is the Pareto decision analysis technique, often referred to as the 80-20 method.

The Pareto method, named after the Italian economist who developed it, assumes that certain variables in any situation determine eighty percent of the results or nonresults, while all of the other variables combined account for only twenty percent of the results or nonresults. The Pareto chart is a bar graph arranged in such a way that the most likely cause of a problem appears significantly larger than all other possible causes. It visually verifies if the suspected problem cause is the one in fact. The following example

illustrates the use of the Pareto decision analysis technique.[38]

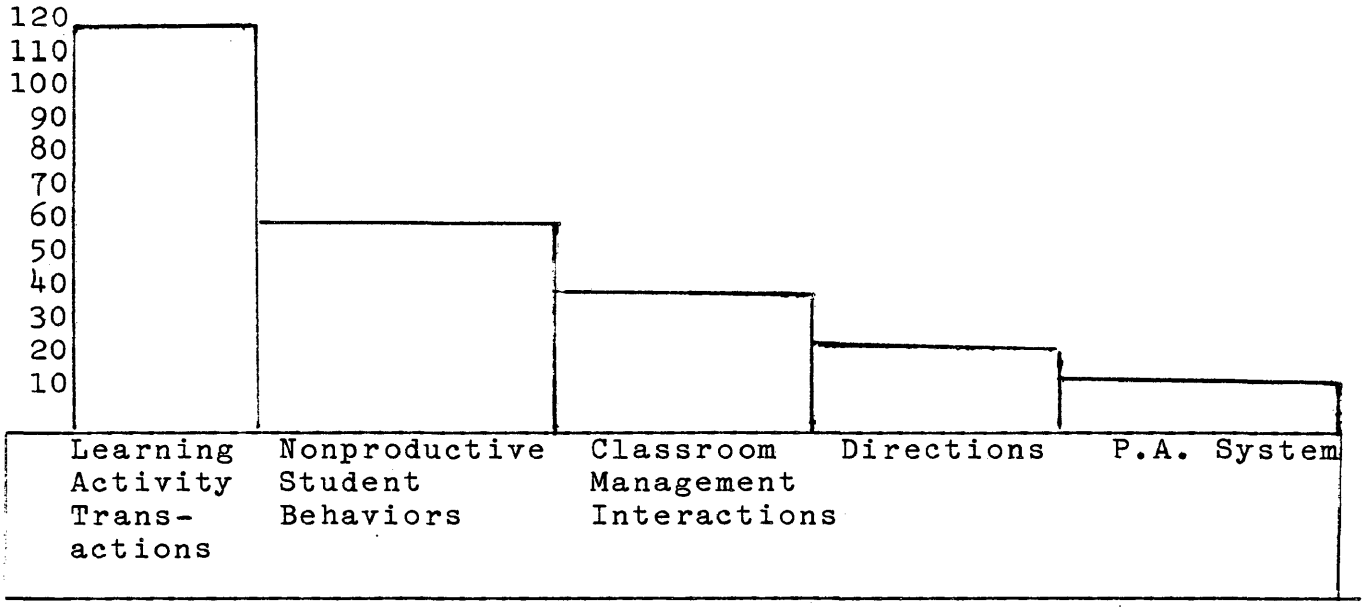
Figure 5

Barriers to Student Engaged Time[39]

	M 9:11:45	T 9-11:45	W 9-11:45	Th 9-11:45	F 9-11:45	Total
P.A. System	3	3	4	2	6	18
Learning Activity Transitions	18	24	18	28	28	116
Classroom Management Interactions	6	11	7	9	4	37
Giving Directions	4	3	8	9	6	30
Nonproductive Student Behavior	10	8	10	12	16	56
One Tally Mark Equals One Minute of Nonengagement						

Figure 6

Pareto Bar Graph



All of the Quality Circle procedures discussed so far are appropriate to use at the solution generation stage. In addition, a cost/benefit analysis may be performed at this time which would help the circle systemtically determine the costs and benefits of each proposed solution as well as the likely effect of each alternative.[40]

Once a cause is verified, a wide-range list of solutions can be introduced and discussed. Utilizing the expertise of the members, a plan may be developed which would permanently remedy the problem. Once this has been accomplished, approval to test the solution on a small scale should be sought and exercised. If more than one solution is tested, the most effective one should be piloted and preventative measures should be taken to insure that the problem does not re-develop.

Quality Circle members must present their solutions, recommendation, and implementation plan to the management (administration) effectively and appropriately so that the proposals will be accepted without delay. "Members learn how to state a purpose, organize data, answer questions, debate a point simply and clearly, and use visuals to support their case."[41] The presenter should acknowledge anyone who helped the circle achieve its result as well as the members themselves. Additional techniques such as force field analysis, failure analysis, cost benefit analysis, histograms, control charts and scatter diagrams may also be utilized.

After the solution has been presented by the Quality Circle members, the management must study and review the suggestions and solutions thoroughly. After the presentation, the reasons for approval or disapproval should be discussed and the Quality Circle should be informed about the management's decisions.

Quality Circles vs. Other Programs

The emphasis of the techniques described (brainstorming, voting, cause and effect analysis, data collection, decision analysis, generating solutions, and management presentation) coupled with the careful training of each member differentiates the Quality Circle from other team problem-solving approaches.

School administrators are often skeptical that the Quality Circle concept is anything new or better than the participative management processes many schools are currently using. Although this is a legitimate defense, one must not ignore the integrity of the Quality Circle concept nor lightly disregard the disciplined, structured principles that make it unique.[42]

A study of Quality Circles reveals differences from other problem-solving programs, as outlined by Donald Dewar, President of the Quality Circle Institute.

- Members select project/problem
- Members analyze problem
- Has its own "Board of Directors"
- Uses management presentations for communication and recognition
- A trained facilitator coordinates Quality Circles
- Leaders and members receive training
- Voluntary
- Meetings are paid for (either take place on company time or on overtime) [43]

Typical Problems for Quality Circle Consideration

A broad range of problems within a school could be addressed by a Quality Circle. Problems need not be of an administrative nature, but simply problems which nag at the daily activities of the teachers. Although addressing district wide managerial concerns may save the system money,

it is also important to solve problems that interfere with job satisfaction and building morale. Larry Chase, the Executive Director of the Northwest Educational Cooperative in Arlington Heights, Illinois, has listed over one hundred school problems that could be considered by Quality Circles.[44] Here are just a few of them.

Typical Problems for Quality Circle Consideration

Teachers

- Improving student discipline
- Improving the use of materials, audiovisual equipment or other school resources
- Increasing time on task with students
- Teaching certain difficult-to-teach students
- Expectations regarding student performance
- Articulation between grade levels, between elementary and junior high, between junior high and high school
- Establishing schoolwide norms and rules for student behaviors
- Reducing employee and student absenteeism
- Reducing vandalism
- Curtailing waste

School Principals

- Finding more time to conduct instructional improvement activities
- Reducing paperwork flow
- Handling communication with parents and other citizens at the school level

- Scheduling problems

Library Aids

- Books coming back damaged
- Books that are overused by teachers and students and aren't there when needed
- Discipline problems in the library

Central Office Secretarial Staff

- Duplication and information processing problems
- Keeping track of district capital equipment for inventory purposes
- Handling irate citizens in a positive manner

Custodians

- More efficient ways to clean a building in less time
- Monitoring major heating and maintenance functions to save costs; energy saving programs
- Developing long-range plans for scheduling building maintenance

Bus Drivers

- Student discipline on the buses
- Orienting and training new drivers

Food Service Workers

- Reducing student waste of school food
- Managing the time problems associated with serving lunches to a large school population

Quality Circles must eventually become integrated into the ethos of the organization. With proper supervision and maintenance, the program will take on the characteristics of

the specific organization. Quality Circles are not an alternative to the management system; they are management tools whereby the organization's members can facilitate effective and efficient problem-solving in order to improve the quality of life within the organization.[45]

When Quality Circles have been implemented and exercised, "problem prevention" becomes a common and appropriate theme. After various problems have been identified, analyzed and solved, Quality Circles may seek to look for potential areas of concern before conflicts surface.

The use of Quality Circles within organizations has also demonstrated financial gains. "It is common for organizations to realize from three to six dollars in cost savings and cost avoidance for every dollar invested."[46]

The Future of Quality Circles

There are glowing reports about the application of the Quality Circle idea, and there is no reason to doubt these success stories. Whether or not Quality Circles will work in the public school setting remains to be seen. Many schools and colleges which implemented Quality Circle programs are beginning to see results. Final responsibility for examining this particular tool rests with individual school administrators. It may be advantageous for schools to informally design individual programs which will utilize facets of the Quality Circle technique in order to achieve

cohesiveness and unity within the building. Regardless of the approach used, full or partial use of the Quality Circle concept improves efficiency and effectiveness by offering alternatives whereby problems can be solved systematically and not reappear.

The future of Quality Circles appears promising because the core of its success lies within the people who participate. As long as there are people who are concerned with improving conditions in order to improve the overall quality of life, the Quality Circle concept holds potential.

> The story of Quality Circles is by no means complete. Quality Circles have no cultural or economic boundaries. The underlying philosophy can work in any society---all that is needed is a strong will and determination. We are moving in a jet age and tomorrow conditions may be even worse. 47

Finally, one of the well-known authorities on quality from Japan, Dr. Ishikawas, has said:

> I am convinced that Quality Circle activities have no socio-economic or cultural limitations. Human beings are human beings wherever they live and Quality Circle activities can be disseminated and implemented anywhere in the world for human benefit. 48

It is critical in this time of fast-paced technology, scientific advancement, economic inbalance and human turbulence, that attention be paid to the needs and concerns of the people. All people think, and it is vital that the world tap the often unexplored and ignored resources of the people. The Quality Circle theme, "There is no limit to what

we can do together," emphasizes that, although the world is in turmoil, it is everyone's responsibility to work together to build the future.

CHAPTER III

METHODOLOGY

Quality Circles are currently enjoying a great level of interest. Today, the nature of work in America is changing rapidly as workers demand more voice in managing their work, and many managers are realizing the overall value of multi-level participative management. Workers are often asked to share their observations and suggestions, and supervisors are seeking new techniques for developing efficient and profitable work places.

Although educators have eagerly accepted the theory behind Quality Circles, few school systems have actually used the Quality Circle concept. With the demands for greater educational effectiveness, education has been thrust to the forefront of national interest. Logic and research indicates that Quality Circles may achieve certain desirable results, and the means whereby Quality Circles are implemented directly influence the training of personnel in problem identification, analysis, and resolution.

It was because of this rationale that the researcher attempted to determine if the training of school personnel in Quality Circle problem-solving techniques would affect the quality of instructional teams at Millard North Junior High School.

The views of decision-making and problem-solving held by the staff are crucial to the success of the Quality Circle

concept, and attempts were made to obtain the views and opinions of the teachers.

A questionnaire regarding the team decision-making practices and the need for a structured method of group problem-solving was given to eight teachers who comprise two of the four eighth grade instructional teams at Millard North Junior High School. The questionnaire sought information in the following areas:

1. team communication
2. team cooperation
3. goal establishment
4. task planning and organization
5. prioritizing of specific problems
6. problem analyzation
7. problem alternatives
8. collection of data and facts
9. structured decision-making steps
10. participative problem-solving techniques
11. team consensus
12. problem-solving motivation
13. sharing of problem-solving experiences

In addition, the teachers were asked to identify areas of team strengths and team weaknesses, and they were encouraged to make comments and suggestions.

On December 3, 1984, and on December 4, 1984, teams B and A, respectively, were given a Quality Circle problem-

solving techniques in-service. The participants were briefly introduced to the Quality Circle philosophy and its history, and the presenter then focused on seven circle techniques: structured brainstorming and voting; data gathering; statistical check sheets; Pareto analysis; fishbone cause-effect analysis; process cause-effect analysis; and presentation. The team members were shown examples of the techniques used in educational settings and they were also given the opportunity to define and analyze a relevant team problem. After the presentations, team members were encouraged to experiment with Quality Circle problem-solving techniques and approximately two months later, on January 25, 1985, a post-questionnaire was given to determine whether the exposure to the Quality Circle concept had had any effect on the instructional team's approach to solving problems.

CHAPTER IV

PRESENTATION OF FINDINGS

A pre-questionnaire was administered to eight instructional team members before they were introduced to Quality Circle problem-solving techniques. The questionnaire was designed to enable each team member to describe the decision-making/problem-solving involvement of his/her team. Approximately two months later, a post-questionnaire was administered to the participants in order to determine whether the Quality Circle problem-solving inservice had had an effect on team decision-making. The following findings were determined by using the mean score of their responses:

Table I

Decision-Making/Problem-Solving Attitudes Questionnaire

Item	Pre	Post	Direction of the Difference
1. team communication is open and authentic.	1.5	1.5	0
2. cooperation/teamwork exists within the team.	1.5	1.4	+
3. the team establishes and meets its goals/ objectives.	1.6	1.8	-

Table I (continued)

Item	Pre	Post	Direction of the Difference
4. the team plans and organizes to accomplish tasks.	1.8	1.8	0
5. specific problems identified and prioritized.	1.8	1.3	+
6. the causes and effects or problems are analyzed.	1.6	1.8	-
7. alternatives are discussed before decisions are made.	1.5	1.9	-
8. solutions/decisions are based on data and facts rather than opinions.	2.4	2.0	+
9. team decision-making is done in accordance with a planned sequence.	1.9	2.3	-
10. different frames of reference, brainstorming, and other participative techniques are used.	1.9	1.9	0
11. decisions and solutions are based on team consensus.	1.4	1.7	-
12. team members are motivated to become involved in the decision-making/problem-solving process.	1.9	1.3	+
13. team members share problem-solving experiences with other teams.	3.0	2.1	+

One should note that a low mean score indicates that the participants rated that problem-solving item positively. A high mean score would indicate that the participants rated that problem-solving negatively. Therefore, a decrease between the pre and post mean scores would indicate a positive behavior change and an increase between the pre and post mean scores would indicate a decline in behavior. The direction of behavior differences results in five improvements, five declines, and three items which remained the same.

In addition to the ratings, the teachers listed what they believed to be their team's key strengths. Here are a few examples:

"good communication"

"attitude of caring"

"cooperation among team teachers"

"sharing of responsibilities"

"diversity of members"

"balance of leadership responsibilities"

The team members were also asked to describe what needed to be done in order for the team to become more effective. Here are some of their comments:

"more time to problem-solve and follow-up"

"keep on the subject during meetings"

"spend more time reinforcing the positive"

"better use of team meeting time"

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In the last few years, attempts have been made to improve the effectiveness of education. Following a period of study and planning, a training session was undertaken by the researcher to familiarize some of the staff members at Millard North Junior High with Quality Circle problem-solving techniques. A study of the effectiveness of the concept and of implementation procedures was conducted to investigate attitude changes before and after involvement. The study involved a Quality Circle problem-solving presentation to eight team members of the Millard staff, a literature review of the Quality Circle concept and its effectiveness, and a pre and post-questionnaire attitude survey. Chapter V has been subdivided into three main categories: (1) Summary, (2) Conclusions, and (3) Recommendations.

SUMMARY

The Quality Circle concept has been credited with increasing employee productivity in the business spectrum. This participative management technique has been implemented in banks, hospitals, the military, industry, and service organizations. In an attempt to improve productivity and educational effectiveness, some educators have studied the Quality Circle concept and a few American schools have implemented quality/performance circle systems.

If educational institutions are to confront the issues of productivity and quality education, educators must focus their energies towards the methods and techniques utilized by school personnel. The implementation of participative management techniques could enable educators to utilize the abilities, experiences and talents of their staff members. Through increased involvement, Quality Circles can improve the effectiveness of educational decision-making and problem-solving by improving the trust, communication and teamwork of the staff.

The researcher expressed a desire for greater staff involvement in the decision-making and problem-solving processes of the instructional teams at Millard North Junior High School. This interest and the willingness of two instructional teams to experiment with Quality Circle techniques lead to the implementation of this research project.

During the 1984 fall semester, two instructional teams volunteered to participate in the Quality Circle problem-solving project. Members of the teams completed a decision-making/problem-solving attitudes pre-questionnaire. Training sessions and circle activities were conducted and members were encouraged to utilize the techniques learned. Early in the 1985 spring semester, the teams completed a decision-making/problem-solving attitudes post-questionnaire. Results of the questionnaires were then studied.

CONCLUSIONS

The major conclusions reached as a result of this study were as follows:

1. The implementation of a Quality Circle problem-solving techniques inservice yielded no overall change in the perceived instructional effectiveness of the teams.
2. The problem-solving item which showed the highest improvement dealt with the sharing of problem-solving experiences with other team members.
3. The problem-solving items which showed the highest decline dealt with the discussion of problem alternatives and the following of a structured problem-solving sequence.
4. Whether the improvements and declines represent a change of attitude or a new awareness of what is currently not being done during team problem-solving cannot be determined from this study.

RECOMMENDATIONS

According to the reliable sources cited in the literature review, Quality Circle training yields improvements in organizational effectiveness, although the results of this study did not substantiate that. It is, therefore, recommended that:

1. A greater number of participants be given additional training beyond the introductory inservice.
2. More rigorous tests need to be developed in order to reliably measure behavior differences.

ENDNOTES

1 E.L. Koch, "Quality of Working Life-Some Potential Applications to Education," Urban Education, Vol. 12, No. 2, (July, 1982), p. 181.

2 Ibid.

3 Ibid., p. 193.

4 Adrienne Garver and Anthony Papania, "Team Teaching: It Works for the Student," Academic Therapy, Vol. 18, No. 2, (November, 1982), p. 191.

5 Mary Montle Bacon, "Team Building in Quality Circles," Educational Quality Circles Consortium, San Mateo County Office of Education, 333 Main Street, Redwood City, California, p. 2.

6 Sud Ingle, Quality Circle Master Guide (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1982), p. introduction.

7 Ibid.

8 Frank M. Gryna, Quality Circle--A Team Approach to Problem-Solving (New York: AMACOM, 1981), p. 9.

9 Ralph Bara, Putting Quality Circles to Work (New York: McGraw-Hill Book Company, 1983), pp. 25-41.

10 Sud and Nima Ingle, Quality Circles in Service Industries (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1982), p. 6.

11 Ibid., p. 7.

12 Eleanor Farrar, Barbara Neufeld and Matthew B. Miles, "Effective Schools Programs in High Schools: Social Promotion or Movement by Merit?" Phi Delta Kappan, Vol. 65, (June, 1984), p. 701.

[13] James A. Bellanca, "Quality Cirles: Making Schools Productive," VocEd, Vol. 57, (May, 1982), p. 31.

[14] Ibid.

[15] Larry Chase, "Quality Circles," Educational Leadership, Vol. 40, No. 5, (February, 1983), p. 18.

[16] Ibid., p. 19.

[17] Ingle (1983) op. cit., p. 32.

[18] Ingle (1982) op. cit., p. 27.

[19] Ibid., pp. 32-34.

[20] Ibid., pp. 34-37.

[21] Ibid., p. 42.

[22] Donald L. Dewar, "Quality Circle: Answers to 100 Frequently Asked Questions," (Red Bluff, California: Quality Circle Institute, 1979), p. 18.

[23] Ingle, (1982) op. cit., pp. 44-47.

[24] Ibid., pp. 47-48.

[25] Dewar, op. cit., pp. 19-20.

[26] Ingle (1982) op. cit., pp. 52-54.

[27] Ibid., p. 61.

[28] Bellanca, op. cit., p. 32.

[29] Chase, op. cit., p. 20.

30 Ingle (1983) op. cit., p. 93.

31 Ibid., p. 124.

32 Chase, op. cit., p. 20.

33 Bellanca, op. cit., p. 36.

34 Chase, op. cit., p. 21.

35 Ibid.

36 Ibid.

37 Ibid.

38 Ibid.

39 Ibid., p. 22.

40 Ibid.

41 Bellanca, op. cit., p. 32.

42 Chase, op. cit., p. 23.

43 Dewar, op. cit., p. 6.

44 Chase, op. cit., p. 23.

45 Ibid., p. 25.

46 Dewar, op. cit., p. 26.

47 Ingle (1982), p. 234.

48 Ibid., p. 242.

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APPENDIX A

January 2, 1985

Dear Colleague:

I am currently researching the concept of quality circles in education as part of my graduate studies. I would appreciate it if you would fill out the attached questionnaire before the inservice session begins. The results will be compiled to evaluate the existing characteristics of the instructional teams at Millard North Junior High School and to assess their attitudes towards team decision-making and problem-solving. Your personal comments and suggestions are also welcome. Thank you for your time and cooperation.

Sincerely,

APPENDIX B

DECISION-MAKING/PROBLEM SOLVING
ATTITUDES QUESTIONNAIRE
Millard North Junior High School
1984-85

This questionnaire is designed to enable each team member to describe the decision-making/problem-solving involvement of his/her team. In completing this questionnaire, it is important that you answer each question as thoughtfully and frankly as possible. For each question, please circle your rating. Thank you for your time and cooperation.

I FEEL THAT WITHIN THE PRESENT DECISION-MAKING/PROBLEM-SOLVING PROCESS...	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. team communication is open and authentic.	1	2	3	4	5
2. cooperation/teamwork exists within the team.	1	2	3	4	5
3. the team establishes and meets its goals/objectives.	1	2	3	4	5
4. the team plans and organizes to accomplish tasks.	1	2	3	4	5
5. specific problems confronting the team are identified and prioritized.	1	2	3	4	5
6. the causes and effects of problems are analyzed.	1	2	3	4	5
7. alternatives to problems are discussed and obtained before decisions are made.	1	2	3	4	5
8. solutions/decisions to problems are based on data and facts rather than opinions.	1	2	3	4	5
9. team decision-making/problem-solving is done in accordance with a planned sequence of steps.	1	2	3	4	5
10. different frames of reference, brainstorming, and other participative techniques are utilized in team problem-solving.	1	2	3	4	5
11. decisions and solutions are based on team consensus.	1	2	3	4	5
12. team members are motivated to become involved in the decision-making/problem-solving process.	1	2	3	4	5
13. team members share problem-solving experiences with other teams.	1	2	3	4	5

14. What do you believe are the team's key strengths? _____

_____

15. If you could, what would you do to make your team more effective? _____

_____

_____