DOCUMENT RESUME

ED 365 878 CE 065 638

AUTHOR Leigh, David
TITLE Total Quality Management (TQM): High School/College Course Material.
INSTITUTION Temple Junior Coll., TX.
SPONS AGENCY Texas State Higher Education Coordinating Board, Austin.
PUB DATE 1 Jun 93
NOTE 83p.; For related documents, see CE 065 639-646.
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Course Content; Course Descriptions; High Schools; Job Training; *Labor Force Development; Learning Activities; Lesson Plans; Management Teams; *Organizational Development; Organizations (Groups); Participative Decision Making; *Quality Control; Staff Development; Teaching Methods; Teamwork; Two Year Colleges; Work Environment
IDENTIFIERS *Total Quality Management

ABSTRACT

This Total Quality Management (TQM) course was designed to introduce students to the principles and tools of TQM in a full-semester course in high schools or community colleges. The course includes all the competencies found in TQM and is intended to be taught with an interactive method in which students are involved in the learning process. This module contains an introduction to the course, a course outline, four class exercises, and a 17-item bibliography. The four exercises include the following: (1) a case study designed to familiarize students with customer surveys and the concept of change and focus on the customer; (2) an exercise showing how to measure the length of a process and leading students to make improvements in the process to reduce the cycle time; (3) an exercise on continuous improvement, empowerment, and processes; and (4) an exercise showing the phases of team development and team conflict resolution. (KC)

# TOTAL QUALITY MANAGEMENT (TQM):



# HIGH SCHOOL / COLLEGE COURSE MATERIAL

Prepared by

David Leigh

TQM/Tech Prep
Temple Junior College
2600 South First Street
Temple, TX 76504
(817) 773-9961 X274
(817) 773-7043 Fax

June 1, 1993

This project is supported by funds from the Carl D. Perkins Vocational and Applied Technology Education Act

# TOTAL QUALITY MANAGEMENT (TQM) COURSE

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# TOTAL QUALITY MANAGEMENT

## COURSE INTRODUCTION

The Total Quality Management (TQM) course was designed to be used either at the high school level or at the community college level. It was designed to be a full semester course.

The intent of the Total Quality Management course is to introduce the student to the principles and "tools" of Total Quality Management. There are two texts used for this course. Total Quality Management: Three Steps to Continuous Improvement by Arthur Tenner and Irving DeToro and The Memory Jogger: A Pocket Guide for Continuous Improvement which is published by GOAL/QPC. These two books give a good overview of the concepts of TQM as well as many of the tools that can be used in Total Quality Management. The course was structured to include all of the competencies that are found in TQM. A review of the course offerings of many other colleges and universities was conducted in order to develop the curriculum for this course. Each of the weeks of study have been outlined with the suggested text references shown. The actual concepts that will be covered during each week are also listed.

Four different class exercises have been designed and are included in this handout. These four are:

- The "WE CARE" Day Care Case Study.
- The "Numbered Ball" exercise.
- The "Bead" exercise.
- "The Cube" team exercise.

The "WE CARE" Day Care case study was designed to familiarize the student with customer surveys and the concept of change and "focus on the customer." This case study can be used over a complete semester with different parts of it done during different phases of the course.

The "Numbered Ball" exercise is a short exercise which is designed to be used after the introduction of Continuous Improvement. The stated purpose of this exercise is to familiarize the students with measuring the length of a process, in this case, touching all of the numbered balls. The students are then to make improvements in the process to reduce the cycle time. The underlying point of this exercise is to show the impact of benchmarking. Once the facilitator describes to the class how it can be done much quicker, the teams are typically able to reduce their cycle time greatly. This is a very good exercise and a visual way of demonstrating benchmarking.

The third exercise is the "Bead" exercise. This exercise is fairly sophisticated and is based upon the "Red Bead Exercise" that Dr. Deming uses. This exercise does not only Continuous Improvement, but also goes heavily into Empowerment and Processes. It is suggested that this exercise be spread out over several class periods.

The "The Cube" team exercise is a very good exercise to show the development of the different phases of team development. It is also a good exercise to help show team conflict resolution and also to show continuous improvement and the elimination of waste. This exercise will require several class periods to complete.

This course on Total Quality Management is intended to be taught in a very interactive method where the students are very involved in the learning process. It should not be taught entirely through the use of lectures. Portions of this course could very well be taught by having students study different areas and present some of the material. The exercises will allow the students to become very involved through their interactive methodology. Total Quality Management tends to limit itself very much to empowerment and teamwork in the class. It is suggested many of the exercises and class assignments be done using teams.

# TOTAL QUALITY MANAGEMENT (TQM) COURSE

## COURSE OUTLINE

Prepared by

David Leigh

TQM/Tech Prep
Temple Junior College
2600 South First Street
Temple, TX 76504
(817) 773-9961 X274
(817) 773-7043 Fax

June 1, 1993

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# TQM COURSE OUTLINE

**COURSE OBJECTIVES:**

-- Demonstrate TQM principles firsthand in the organization and operation of the class.

-- The student will gain an understanding of the definition and practical application of quality.

-- The student will learn of the competitive nature of the world economy and of the nature and need for change.

-- The student will gain an historical background of TQM and the need for TQM.

-- The student will obtain an understanding of the major recognized "gurus" in TQM (Deming, Juran, Crosby, Glasser) and the differences and similarities of their approaches.

-- The student will obtain an understanding of the vocabulary of TQM.

-- The student will obtain a working knowledge of the major initiatives of TQM:
- -- Customer Satisfaction
- -- Employce Empowerment
- -- Continuous Improvement
- -- Teamwork / Self-directed Teams
- -- Benchmarking
- -- Leadership vs. Management
- -- Shared Vision / Constancy of Purpose
- -- Importance of Training
- -- Processes
- -- Measurement and Assessment
- -- Reduced Cycle Time
- -- Elimination of Waste / Defects
- -- Cost of Quality (Cost of nonconformance)

-- The student will have the opportunity to gain skills in the basic tools of TQM:
  - -- Brainstorming
  - -- Problem Solving
  - -- Checksheets
  - -- Weighted Voting
  - -- Nominal Group Technique
  - -- Criteria Ranking Form
  - -- Paired Comparisons
  - -- Process Flow Diagrams
  - -- Histograms
  - -- Pareto Charts
  - -- Control Charts
  - -- Cause and Effect Diagrams (Fishbone Diagrams)
  - -- Customer Surveys
  - -- Force Field Analysis
  - -- Cost-Benefit
  - -- Process Capability and Variation
  - -- Quality Functional Deployment (QFD)
  - -- Gantt Charts
  - -- PERT Charts

-- The student will have numerous opportunities to practice the principles of TQM through several team projects.

-- The student will demonstrate competency through the successful completion of a term project where the tools and initiatives of TQM will be demonstrated.

**TEXTS:**

Total Quality Management: Three Steps to Continuous Improvement, by Arthur R. Tenner and Irving J. DrToro, Addison-Wesley Publishing Co. Inc., 1992.

The Memory Jogger: A Pocket Guide of Tools for Continuous Improvement, by GOAL/QPC, 15 Branch Street, Methuen, MA 01844, 1988.

**CLASS EXERCISES:**

"WE CARE" Day Care Case Study
The "Numbered Ball" Exercise
The "Bead" Exercise
"The Cube" Team Exercise

**COURSE OUTLINE:**

**-- WEEK 1** Tenner and DeToro (T&D) Chapters 1,3

-- Class Organization (Vision, Mission, Teams)
-- Vision / Shared Vision / Constancy of Purpose
-- Concept of Paradigms (Joel Barker)
-- World Economy and U.S. Competitiveness
-- Concepts of Change and the Need for Change
-- Definition of Quality
-- Introduction of Term Project ("WE CARE" Day Care)
-- Handout of TQM Vocabulary (Glossary)

**-- WEEK 2** T&D Chapter 2

-- Discussion of "WE CARE" Day Care concerning paradigms/change
-- History of TQM from a Worldwide Perspective
  -- Sarasohn/Protzman
  -- Deming
  -- Juran
  -- Shewhart/Feigenbaum
  -- Crosby
  -- Glasser
  -- Ishikawa/Taguchi
-- History of TQM Movement in the U.S. since 1980
-- Current Status of TQM Movement in U.S.
-- Deming's Fourteen Points
-- Juran's Three Principles
-- Crosby's Fourteen Points
-- Glasser's Five Needs
-- Cost of Quality
-- Discussion of "WE CARE" Day Care relative to meeting Glasser's needs and Deming's Fourteen Points.

**-- WEEK 3** T&D Chapters 5,6,7

-- Commonality/Differences in Philosophies of Deming/Juran/Crosby
-- Introduction to Major TQM Initiatives and Tools
-- Introduction to the "Cornerstones" of TQM
-- Concept of the Customer / Customer Satisfaction
-- Customer Surveys

-- WEEK 3 (Continued)

-- Examples of Effective/Ineffective Customer Focus
-- Discussion of "WE CARE" Day Care relative to identification of of the customers and a customer survey

-- WEEK 4 — The Memory Jogger (MJ) Supplemental Materials on Tools

-- Introduce the Concept of Continuous Improvement
-- Problem Solving
    -- Step 1: Identifying and Selecting the Problem
        -- Tools for Generating Ideas
            -- Brainstorming — MJ p.69
        -- Tools for Collecting Information
            -- Checksheets — MJ p.14-16
            -- Interviews
            -- Surveys
        -- Tools for Problem Selection
            -- Nominal Group Technique — MJ p.70-71
            -- Weighted Voting
            -- Criteria Rating Form
            -- Paired Comparisons
    -- Step 2: Analyzing the Problem
        -- Tools for Analyzing Data
            -- Checksheets — MJ p.14-16
            -- Cause-and-Effect Diagrams (Fishbone Diagrams) — MJ p.24-29
            -- Pareto Charts — MJ p.17-23
            -- Histograms — MJ p.36-43
            -- Force Field Analysis — MJ p.72-73
-- Team Exercises In Class

-- WEEK 5 — The Memory Jogger (MJ) Supplemental Materials on Tools

-- Problem Solving (Continued)
    -- Step 3: Generating Potential Solutions
        -- Tools for Generating Ideas
            -- Brainstorming — MJ p.69
        -- Tools for Collecting Information
            -- Checksheets — MJ p.14-16

-- WEEK 5 (Continued)

-- Interviews
-- Surveys
-- Step 4: Selecting and Planning a Solution
-- Tools for Selecting a Solution
-- Nominal Group Technique — MJ p.70-71
-- Weighted Voting
-- Criteria Rating Form
-- Cost-Benefit
-- Paired Comparisons
-- Tools for Planning and Implementing a Solution
-- Gantt Chart
-- PERT Chart
-- Flow Chart
-- Step 5: Implementing the Solution
-- Management Presentation — MJ p.74
-- Step 6: Evaluating the Solution
-- "WE CARE" Day Care Case Study Using Teams for Problem Solving

-- WEEK 6 — T&D Chapters 4,7,8; The Memory Jogger

-- Concept and Importance of Processes — T&D Chpt 4,8
-- Process Flow Diagrams — MJ p.9-13
-- Benchmarking — T&D Chpt 7
-- "Numbered Ball" Exercise in Class

-- WEEK 7 — T&D Chapters 9,10,11; The Memory Jogger

-- Continuous Improvement — T&D Chpt 9
-- Measurement and Assessment — T&D Ch 10,11
-- Process Capability and Variation — MJ p.64-68
-- "Bead" Exercise in Class

-- WEEK 8 — T&D Chapter 13

-- Employee Empowerment
-- ZAPP vs. SAPP
-- "Bead" Exercise in Class

-- **WEEK 9** T&D Chapter 13

-- Teamwork
-- Self-directed Teams
-- Quality Improvement Teams
-- Team Exercises in Class - Introduce "The Cube" team exercise
-- "Bead" Exercise in Class

-- **WEEK 10** T&D Chapter 13

-- "The Cube" Team Exercises in Class

-- **WEEK 11** T&D Chpts 12,16

-- "The Cube" Team Exercise Review
-- Listening Skills
-- Leadership vs. Management T&D Chpt 12
-- Importance of Training and Education T&D Chpt 16

-- **WEEK 12** T&D Chapters 6,14

-- Role of the Supplier in TQM T&D Chpt 14
-- Reduced Cycle Time (JIT)
-- Elimination of Waste
-- Quality Functional Deployment (QFD) T&D Chpt 6
-- Discussion of "Bead" Exercise relative to the role of the supplier, reduced cycle time and elimination of waste

-- **WEEK 13**

-- "Bead" Exercise Review
-- Team Exercises in Class ("Bead" Exercise Recommendations)
-- Project Reports from Teams ("Bead" Exercise Recommendations)

-- **WEEK 14** T&D Chapter 17

-- Deming / Juran / Crosby Revisited
-- Broad Perspective of TQM
-- Baldrige Award / ISO 9000
-- Brainstorming on Future Direction of TQM in the U.S.

-- **WEEK 15** T&D Chapter 18

-- TQM Implementation Strategies
-- Work on Term Projects ("WE CARE" Day Care Case Study)
-- Presentation of Term Projects ("WE CARE" Day Care Case Study Recommendations)

-- **WEEK 16**

-- Assessment of the Class with Recommendations for Improvement for Future Classes
-- Review
-- Final Exam

# TOTAL QUALITY MANAGEMENT (TQM) COURSE

## CLASS EXERCISES

A. "WE CARE" Day Care Study
B. The "Numbered Ball" Exercise
C. The "Bead" Exercise
D. "The Cube" Team Exercise

Prepared by

David Leigh

TQM/Tech Prep
Temple Junior College
2600 South First Street
Temple, TX 76504
(817) 773-9961 X274
(817) 773-7043 Fax

June 1, 1993

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# TOTAL QUALITY MANAGEMENT (TQM)

## "WE CARE" DAY CARE CASE STUDY

CONTENTS:

# COMPETENCY PORTFOLIO

## ("WE CARE" DAY CARE CASE STUDY)

| COMPETENCY | TOTAL QUALITY LEARNING MATRIX | | | | | |
|---|---|---|---|---|---|---|
| | KNOW-LEDGE | KNOW-HOW | WISDOM | | | |
| | KNOW-LEDGE | COMPRE-HENSION | APPLICA-TION | ANALYSIS | SYNTHESIS | EVALUA-TION |
| CUSTOMER SATISFACTION | X | X | X | X | X | X |
| EMPLOYEE EMPOWERMENT | X | X | X | X | | |
| LEADERSHIP VS. MANAGEMENT | X | X | X | | | |
| COST OF QUALITY | X | | | | | |
| BRAINSTORMING | X | X | X | | | |
| NOMINAL GROUP TECHNIQUE | X | X | X | | | |
| CHECKLISTS | X | X | X | | | |
| PROBLEM SOLVING | X | X | X | X | | |
| PARETO CHARTS | X | X | X | X | | |
| CAUSE AND EFFECT DIAGRAMS | X | X | X | | | |
| CUSTOMER SURVEYS | X | X | X | X | X | |

# "WE CARE" DAY CARE

# CASE STUDY

## OBJECTIVE:

The objective of this case study is to allow the participant to gain experience in several tools of TQM. In addition to the use of several TQM tools, the participant will gain experience in several TQM initiatives.

## TQM INITIATIVES DEMONSTRATED:

- Customer Satisfaction
- Employee Empowerment
- Leadership vs. Management
- Cost of Quality

## TQM TOOLS DEMONSTRATED:

- Brainstorming
- Nominal Group Techniques
- Problem Solving
- Pareto Charts
- Cause and Effect Diagrams
- Customer Surveys

# "WE CARE" DAY CARE

**Established in 1962**

**Located near downtown Burgsville, Texas, population 50,000**

**Where our motto is: "We take care of your little boys and girls just like we took care of you, because WE CARE".**

"Hello, my name is Irma Marie Wright, the founder and head teacher here at WE CARE. I started WE CARE Day Care back in 1962, right after my husband, Robert, and I moved to sleepy little Burgsville. Robert worked in the hardware store downtown and we lived a few blocks away in a quiet little neighborhood.

I started keeping a couple of neighborhood kids in my house at first. Burgsville sure was a friendly little town then with only about 5,000 people here. When they opened the big factory in Boomstown, my business really picked up.

I had to buy a little house around the corner in 1966 when WE CARE outgrew our house. I have had to make two additions to the day care through the years. We had as many as 100 children here back in 1975 when Burgsville reached a population of 20,000. Things were really going good back then. WE CARE was making enough money that Robert and I were able to buy half interest in the hardware store where Robert worked.

Things haven't been going so well since then, though. I think it all started when Modern Electronics opened up a big factory about halfway between here and Boomstown in 1976. It seems like all the new people in town have built out there on the north side of town. All the businesses have been moving out there, too. They opened up a big mall on the edge of town back in 1980. That sure did hurt the hardware store's business, too. Why, they even closed down the elementary school down the street a couple of years ago.

WE CARE just isn't the same. We are down to 25 kids now. I just don't understand what's wrong. We haven't changed anything here. I pride myself in our new motto -- 'We take care of your little boys and girls just like we took care of you, because WE CARE'. We are providing the same services we did 30 years ago. Even though Modern Electronics is working around the clock, we have had to cut back our hours to 7:30 until 5:30.
There is also a lot more turnover in our workers than there used to be -- you know, it's hard to get good help. I don't understand why they keep leaving. I pay minimum wage and tell them everything to do. They don't have to think for themselves.

I just don't know what to do. I'm too young to retire. I still have a daughter, Sally, who just started to college. Robert's hardware store isn't doing well either. I thought of selling WE CARE, but no one will pay close to what I think the place is worth. Well, Sally came home from school last week and said she was taking this course in TQM, whatever that is, and told me I needed to look at making some changes here at WE CARE. Well, I told her that I was running this place long before she was born. She told me that a couple of new day cares out close to the Modern plant were still growing and were actually charging $5 per week more than WE CARE.

Sally even said that I should start looking at satisfying the parents. She even called them customers. I really told her off then. Why, some of those parents grew up at WE CARE and sure were happy then. Why should they have changed. Well, Sally didn't have much more to say after that. I just don't know why these 19 year olds think they know so much.

You seem like such a nice person. What do you think I should do? Do you really think changes will help at WE CARE?"

# THE "WE CARE" DAY CARE CASE STUDY

## FACILITATOR'S INSTRUCTIONS:

Note: Make sure all supplies (copies) are available before starting the exercise (see sheet titled "List of Handouts")

1. Use the sheets titled "Competency Portfolio" and "Objective" to introduce this case study. Explain that this case study will provide an opportunity to gain an understanding of customer satisfaction, employee empowerment and leadership. They will also gain some experience in several of the tools of TQM.

2. Introduce the actual case study by handing out copies of the narrative on "WE CARE" Day Care which starts with "Established in 1962." It is appropriate to have the student read this as a homework assignment or read it in class, depending on the approach used in the case study.

3. Hand out the sheet titled "Need for Change." This could have been handed out along with the narrative and included as a homework exercise or it can be given to the students after the narrative is assigned.

   Note: The subjects of change and paradigms need to be introduced prior to this sheet being used.

4. When the "Need for Change" sheet is completed, lead the class in a group discussion of all questions. Question #1 should gain a "Yes" response from all students. If not, understand their point of view.

Questions #2 and #3 will have a wide range of responses. You may want to list them as the students mention them. Several potential responses to #2 are:

1. decreasing enrollment
2. high turnover in employees
3. competitors are doing better
4. her daughter recognized that problems exist
5. Ms. Wright is asking for an opinion

Several potential responses to #3 are:

1. the services are the same as they were 20 years earlier
2. the workers should not be allowed to "think" for themselves
3. there seems to be no consideration of changing locations

Questions #4 will probably have mixed responses. Some will think Ms. Wright wants to change and others won't believe she will ever change. As the facilitator, take the position that Ms. Wright really does want change (otherwise this case study might as well end). Discuss the "cost of quality." In this case the cost of quality is the revenue lost when We Care's enrollment decreased from 100 to 25. The actual dollar amount can be estimated.

5. Hand out the sheets titled "The Customer," and "The Customer: Little 'c'". These can either be a homework assignment or can be done in class.

6. Discuss the sheet titled "The Customer." You may want to list the customers that the students mention. The "Big 'C'" customer will probably be the parents. There will probably be some discussion that the children are the "Big 'C'" customer. They should be considered "Little 'c'" customer. Other "Little 'c'" customers mentioned could be the employees and local employers. There might be others mentioned.

   Questions #2 and #3 might have different responses. Hopefully the students will feel that a customer survey is the best answer for #3. If not, lead the discussion in that direction and suggest that a customer survey might be a useful tool in understanding what the customer wants.

7. Lead a discussion of the sheet titled "The Customer: Little 'c'". (2 pages) The students might consider the employees or children as the "Little 'c'" customers. There may be several areas that the students have not filled in.

8. Assign "The Customer: Big 'C'" to the students. This can be either a homework or classroom example. You may choose to have the class work in teams to develop this list. Some of the responses to questions #2 could include:

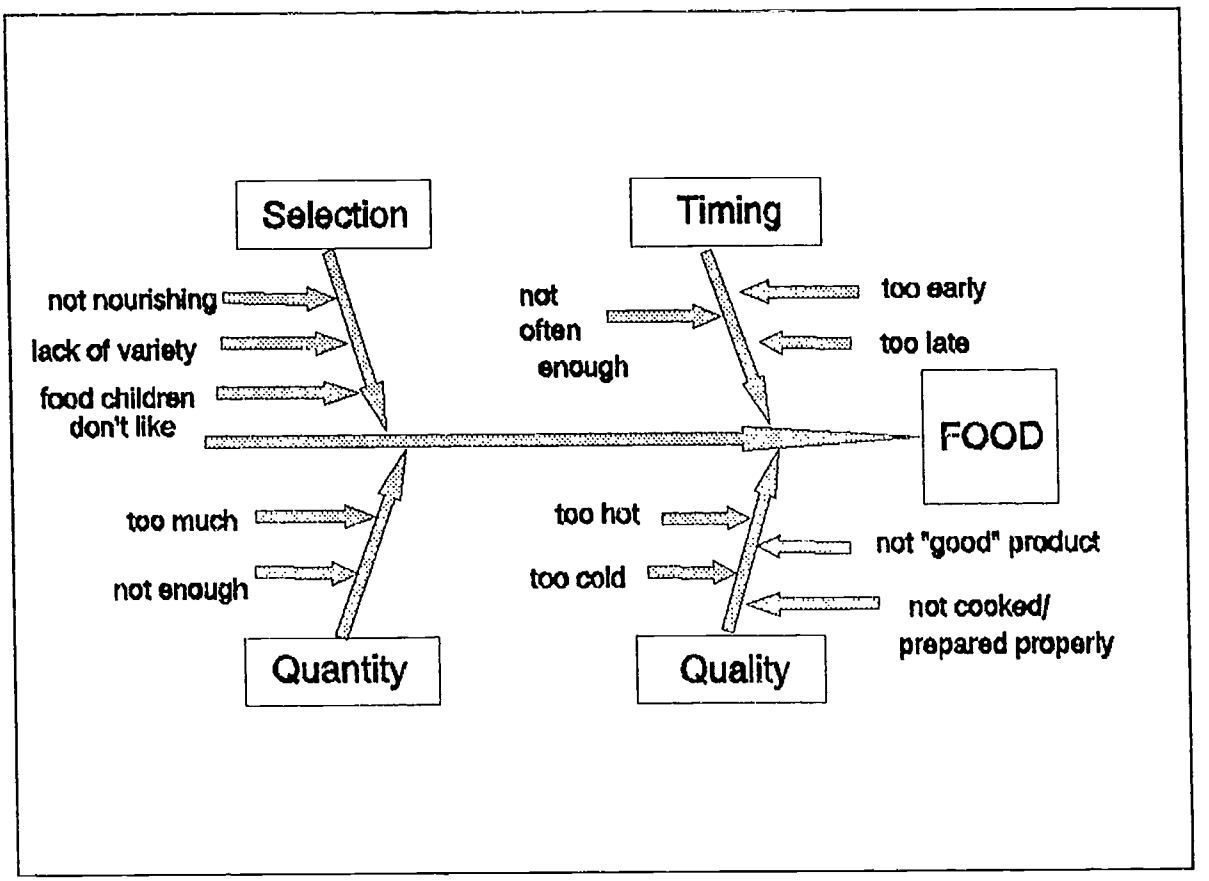
   1. current parents (current customers)
   2. parents who no longer bring their children to "We Care" (old customers)
   3. parents who do not bring their children to "We Care" (potential customers)

9. Have the students answer the "sample initial customer survey." They should work on this individually, either in class or as homework.

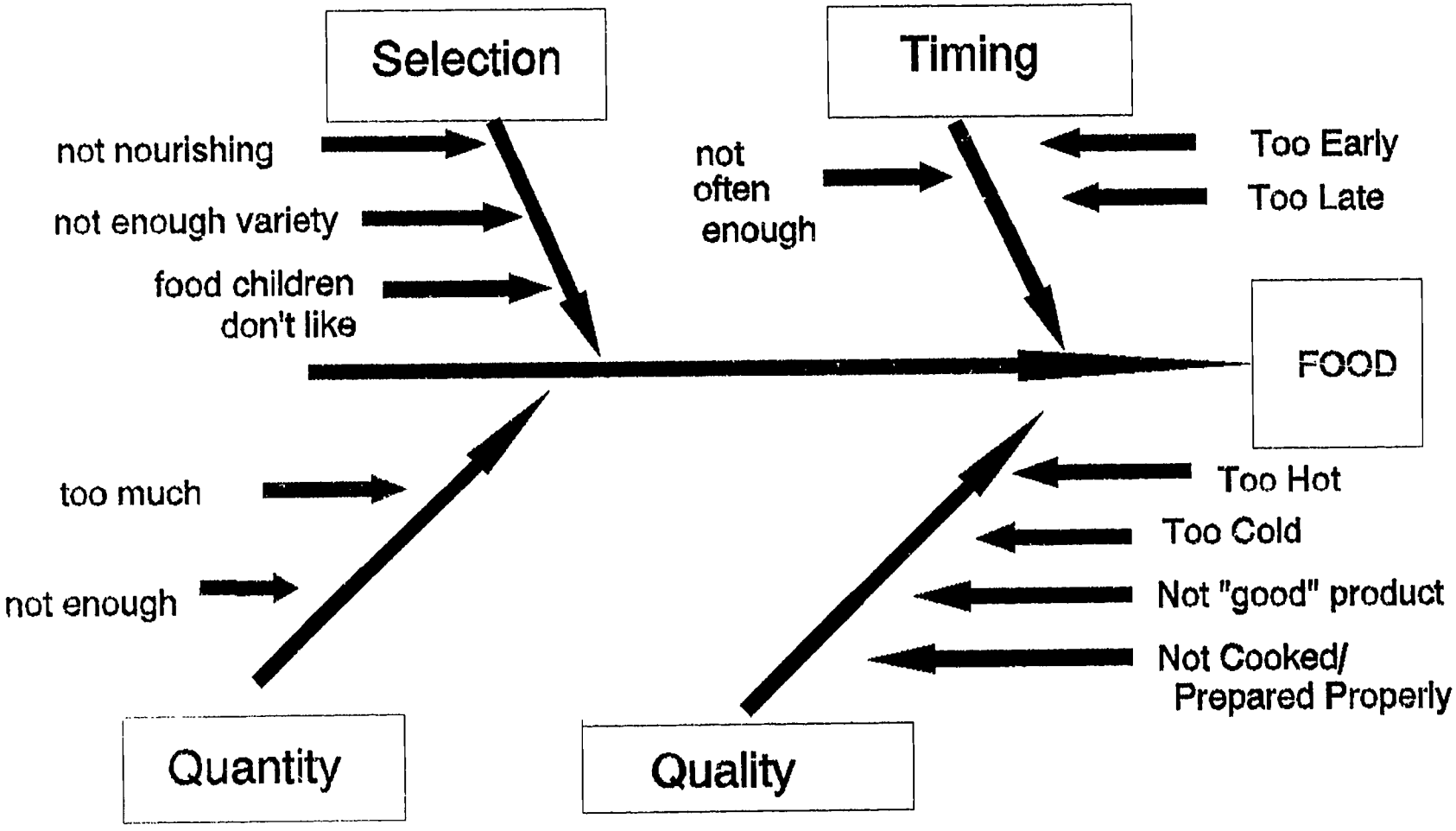
10. When the students have completed the survey, use the TQM tool "checklist" to list all the items they have identified in #1. Then use the tool "nominal group technique" to determine the most important items and rank all items using a "pareto chart."

11. Use "checklists" to list all the students' responses to questions #2 and #3. Use a "pareto chart" to list the items in #2 in order of frequency mentioned. Do the same with the items listed in question number 3.

12. Use a "cause and effect" diagram or "fishbone diagram" to look at one of the items in #2. Have the students help complete the diagram. An example for the "food" could look something like:




13. Assign the students to work in teams to use "problem solving" techniques to address one of the problems in question number 2 or 3. Assign a different problem to each team. The teams should have at least four members, but not more than six.


Selection
Timing
not nourishing
not enough variety
food children don't like
not often enough
Too Early
Too Late
FOOD
too much
not enough
Too Hot
Too Cold
Not "good" product
Not Cooked/ Prepared Properly
Quantity
Quality

This problem solving should be done in class with each team presenting their problem solving approach and their recommended solution to the problem. The main focus should be on the approach used compared to the actual solution developed. They should be able to demonstrate all six steps. Some teams will want to start with a solution and justify their approach based on this solution. They should follow all six steps in sequence.

14. As a final assignment, give the class the assignment to make a recommendation to Ms. Wright concerning her business. This recommendation should be at least a page in length but should not be over two pages (do not penalize for length).

    The class should determine what should be in the recommendation. Examples are: the recommendation should be based on facts, it should address one particular problem, it should give specific solutions, etc. They key is to have the students determine what is expected. The recommendation should be based on sound TQM principle and the language should use the terminology of TQM.

15. Do not penalize students who have collaborated on this final assignment. You should specifically not tell them they can't work in teams. If the students feel empowered to work in teams, this will be an indication of how well they have accepted and been able to apply the concepts of TQM.

# THE "WE CARE" DAY CARE CASE STUDY

## CASE STUDY OUTLINE:

1. Case Study Introduction
2. Hand out the narrative
3. Assign "Need for Change"
4. Discuss "Need for Change"
5. Assign "The Customer" and "The Customer: Little 'c'"
6. Discuss "The Customer" and "The Customer: Little 'c'"
7. Assign "The Customer: Big 'C'"
8. Discuss "The Customer: Big 'C'"
9. Assign the "Sample Initial Customer Survey"
10. Analyze responses to the "Sample Initial Customer Survey" using TQM techniques
11. Assign teams to use problem solving techniques to resolve problems identified in survey
12. Team Reports
13. Assign final assignment (recommendation to Ms. Wright)

# "WE CARE" DAY CARE CASE STUDY

## LIST OF HANDOUTS:

1. Narrative
2. Need for change
3. "The Customer"
4. "The Customer: Little 'C'" (2 pages)
5. "The Customer: Big 'C'"
6. Sample Initial Customer Survey (2 pages)

# "WE CARE" DAY CARE

**NEED FOR CHANGE:**

1. Do you see the need for change in WE CARE Day Care?

   Yes No

2. What factors lead you to suspect that changes are required?

_____

_____

_____

_____

3. What are some of the paradigms that you think Irma Wright has?

_____

_____

_____

_____

4. Do you believe Irma will be willing to change? Why?

_____

_____

_____

_____

wecare1

# "WE CARE" DAY CARE

**THE CUSTOMER:**

1. List Irma Wright's customers. Place a "big 'C'" by the paying customer(s) and a "little 'c'" by the internal customers.

_____

_____

_____

_____

_____

2. What can Irma do to improve her "big 'C'" customer satisfaction?

_____

_____

_____

3. What is the first step she should take?

_____

_____

_____

_____

wecare2

# "WE CARE" DAY CARE

**THE CUSTOMER:** "Little 'c'"

1. List Irma Wright's internal customers (little "c").

_____

_____

2. How is she meeting or failing to meet their basic needs as described by Dr. Glasser?

A. Survival/Security:

_____

_____

B. Love & Belonging:

_____

_____

C. Power & Competition:

_____

_____

D. Freedom & Choices:

_____

_____

E. Fun & Learning:

_____

_____

# "WE CARE" DAY CARE

**THE CUSTOMER:** "Little 'c'" (Continued)

1. What are some things that you would suggest that Irma do to better meet the needs of her internal customers? It is not necessary to make suggestions if you feel she is already meeting a need adequately.

A. Survival/Security:

_____

_____

B. Love & Belonging:

_____

_____

C. Power & Competition:

_____

_____

D. Freedom & Choices:

_____

_____

E. Fun & Learning:

_____

_____

# "WE CARE" DAY CARE

**THE CUSTOMER:** (Big "C")

1. Make a list of questions that you think Irma should ask her paying customers in order to measure their satisfaction.

A. _____

_____

B. _____

_____

C. _____

_____

D. _____

_____

E. _____

_____

F. _____

_____

2. Who should Irma have answer these questions? Why?

_____

_____

_____

# "WE CARE" DAY CARE

## SAMPLE INITIAL CUSTOMER SURVEY

Dear Customer,

WE CARE wants your opinion. Please take a couple of minutes to answer the following questions. We will use this information to improve your child's care.

1. Please list those things you look for when selecting a child care facility.

( ) _____

_____

( ) _____

_____

( ) _____

_____

( ) _____

_____

( ) _____

_____

( ) _____

_____

** Please number the items you listed above in order of importance by placing a number in the parenthesis.

wecare6

2. Please place an "X" beside those items below that you are not satisfied with at WE CARE. You may mark more than one and also list additional items.

| | | | |
|---|---|---|---|
| Location | ___ | Playground | ___ |
| Price | ___ | Workers | ___ |
| Food | ___ | Activities | ___ |
| Cost | ___ | Education Opportunities | ___ |
| Child Safety | ___ | | |

_____

_____

_____

_____

3. If you marked more than one item above, which one are you most dissatisfied with at this time?

_____

Thank you very much for providing us with your opinion.

**WE CARE**

# TOTAL QUALITY MANAGEMENT (TQM)

## "NUMBERED BALL" EXERCISE

CONTENTS:

# COMPETENCY PORTFOLIO

## ("NUMBERED BALL" EXERCISE)

| COMPETENCY | TOTAL QUALITY LEARNING MATRIX | | | | | |
|---|---|---|---|---|---|---|
| | KNOW-LEDGE | KNOW-HOW | WISDOM | | | |
| | KNOW-LEDGE | COMPRE-HENSION | APPLICA-TION | ANALYSIS | SYNTHESIS | EVALUA-TION |
| CONTINUOUS IMPROVEMENT | X | X | X | X | | |
| TEAMWORK | X | X | X | | | |
| BENCHMARKING | X | X | X | X | | |
| MEASUREMENT AND ASSESSMENT | X | X | X | | | |
| BRAINSTORMING | X | X | X | | | |
| STATISTICAL TECHNIQUES | X | | | | | |

# CONTINUOUS IMPROVEMENT EXERCISE

# (THE NUMBERED BALL GAME)

TQM PRINCIPLES DEMONSTRATED:

1. Continuous Improvement
2. Teamwork
3. Quality Measurement / Assessment
4. Benchmarking
5. Tools:
    A. Brainstorming
    B. Statistical Techniques

# CONTINUOUS IMPROVEMENT EXERCISE

# (THE NUMBERED BALL GAME)

LEARNING POINTS:

1. The student will gain the opportunity to observe that a process can gain continuous improvement through following the Shewart Cycle (plan, do, study, action).

2. The student should be able to see that, by using the tool of brainstorming, good ideas can be developed quicker than by working alone.

3. The student will gain experience in taking measurements and placing these measurements on a chart.

4. The student will gain an appreciation for the need to benchmark other similar processes. They will observe that, once benchmarking is done, major improvements can be made in their process.

# CONTINUOUS IMPROVEMENT EXERCISE

# (THE NUMBERED BALL GAME)

FACILITATOR'S INSTRUCTIONS:

1. Introduce this exercise as an opportunity for the class to learn more about the principle of continuous improvement by playing a game.

2. Divide the class into teams with from 4 to 8 members in each team. Provide each team with a place to work where they will not be able to see the other teams. (The teams should not have any interaction during the game.)

3. Instruct each person not to talk to people who have not taken this class about this game. The other people will not learn as much if they have the benefit of your class member's knowledge.

4. Give each team a set of balls numbered from 1 to 6 (If the team has less than 6 members, give each person on the team one ball.). Also provide each team with a stopwatch, a copy of the rules and a chart for keeping time measurements.

5. Instruct the class that they will have 30 minutes to complete the game.

6. Make yourself available to answer any questions that the teams may have prior to the start of the game and during the period of the game. DO NOT interpret the rules! Let each team determine what the rules mean.

7. Walk around and observe each team in action. If the teams have clearly misinterpreted the rules, help them out by making clarifications. Do not tell the teams how good they are doing. (they will probably ask)

FACILITATOR'S INSTRUCTIONS: (Continued)

8. After 20 minutes have passed, go to each team and tell them that another team has been able to complete the exercise in less than 1/2 second.

9. Have all the students reconvene after the 30 minutes are over. Ask the class what they learned from the exercise that was just completed.

10. After sufficient discussion, explain to the class that they have had an opportunity to gain experience in several different principles of TQM, such as the Shewhart Cycle, continuous improvement, brainstorming, assessment, and teamwork. Point out that the main point of this exercise is to show the importance of benchmarking and how major improvements can be made once you find out that "someone else can do it."

# CONTINUOUS IMPROVEMENT EXERCISE

## (THE NUMBERED BALL GAME)

RULES: (30 Minute Time Limit)

1. Each team member must touch each ball in sequential order (1 - 6), but can only touch one ball at a time.

2. The balls must be held during the time trials.

3. Two people can't touch the same ball at the same time except the person holding the ball.

4. Discuss methods for performing this exercise with all team members before timing any of your efforts.

5. Establish your process for performing the task.

6. Test out your defined process before you take a time measurement.

7. Time your process using a stopwatch. The process time will start when a team member says, "Go" and will end as soon as the final team member touches the last ball.

8. Record the time on a piece of paper. You may take as many measurements as you wish, but do not modify your process. Record the fastest time.

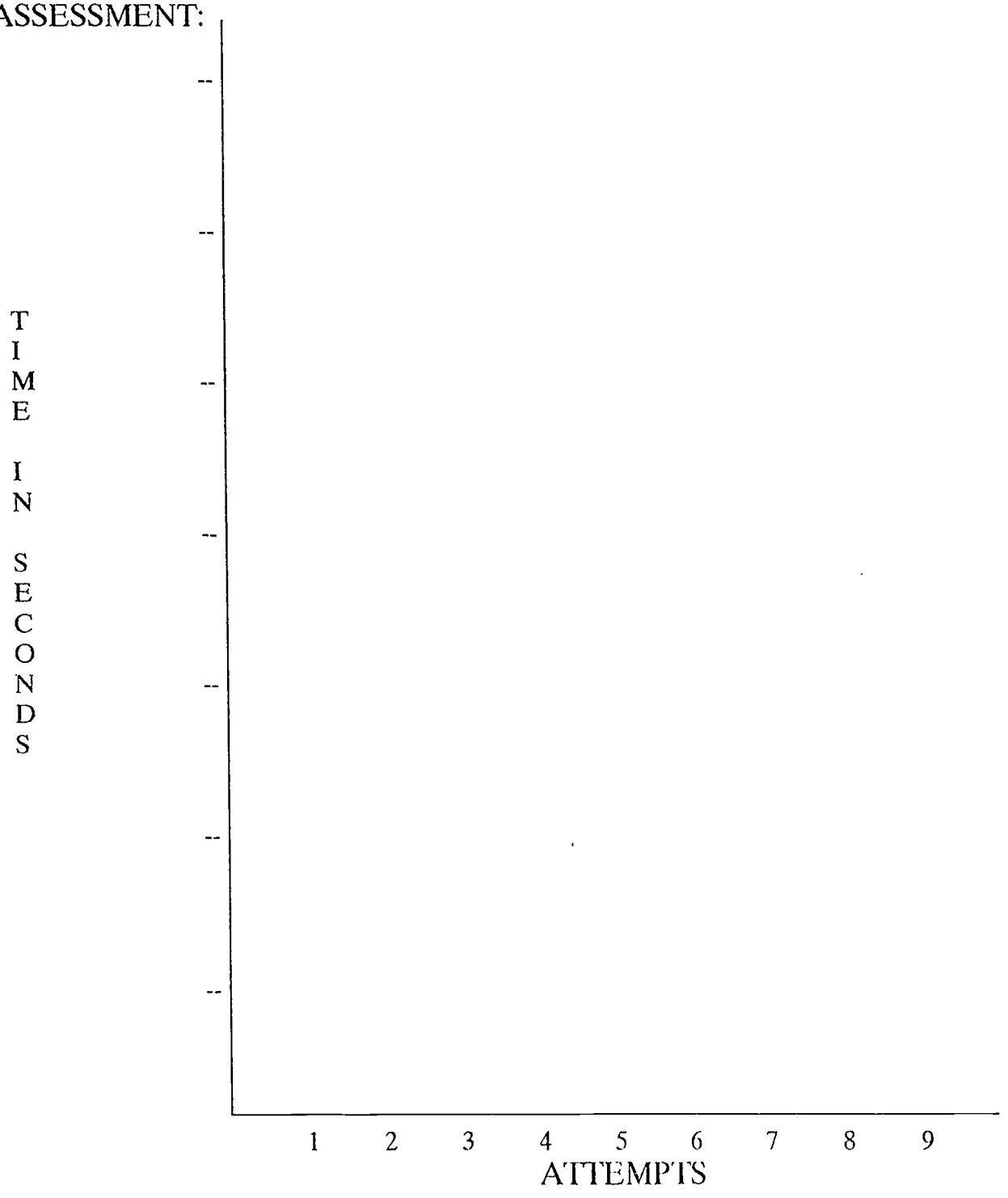
9. Discuss your process with the team members and make improvements to your process to improve your time.

10. Repeat steps 6 through 9 as often as you wish in the time allowed. Make sure that only one time is recorded for each different process improvement.

# CONTINUOUS IMPROVEMENT EXERCISE

**(Numbered Ball Game)**

ASSESSMENT:




ballgam4

# TOTAL QUALITY MANAGEMENT (TQM)

## "THE BEAD" EXERCISE

CONTENTS:

# COMPETENCY PORTFOLIO

## (THE "BEAD" EXERCISE)

| COMPETENCY | TOTAL QUALITY LEARNING MATRIX | | | | | |
|---|---|---|---|---|---|---|
| | KNOW-LEDGE | KNOW-HOW | WISDOM | | | |
| | KNOW-LEDGE | COMPRE-HENSION | APPLICA-TION | ANALYSIS | SYNTHESIS | EVALUA-TION |
| EMPLOYEE EMPOWERMENT | X | X | X | | | |
| CONTINUOUS IMPROVEMENT | X | X | X | X | X | X |
| TEAMWORK | X | X | X | | | |
| BENCHMARKING | X | X | X | | | |
| PROCESSES | X | X | X | X | | |
| MEASUREMENT AND ASSESSMENT | X | X | | | | |
| REDUCED CYCLE TIME | X | X | X | X | | |
| ELIMINATION OF WASTE | X | X | X | X | X | X |
| COST OF QUALITY | X | X | X | X | X | X |
| BRAINSTORMING | X | X | X | | | |
| PROBLEM SOLVING | X | X | X | X | X | X |
| PROCESS VARIATION | X | X | | | | |
| PROCESS FLOW DIAGRAMS | X | X | X | X | | |
| HISTOGRAMS | X | | | | | |
| CONTROL CHARTS | X | | | | | |
| STATISTICAL TECHNIQUES | X | | | | | |

C:COMP4

# THE "BEAD" EXERCISE *

## OBJECTIVE:

The objective of this exercise is to allow the participant to gain experience in several tools of TQM. In addition to the use of several TQM tools, the participant will gain experience in several TQM initiatives.

## TQM INITIATIVES DEMONSTRATED:

- Employee Empowerment
- Continuous Improvement
- Teamwork
- Processes
- Measurement & Assessment
- Elimination of Waste & Defects
- Cost of Quality
- Benchmarking

## TQM TOOLS DEMONSTRATED:

- Brainstorming
- Problem Solving
- Process Variation
- Histograms
- Control Charts
- Process Flow Diagrams

* This exercise was inspired by the "Red Bead Game" developed by Hewlett Packard Corporation and used by Dr. W. Edwards Deming.

C:BEAD1

# THE "BEAD" EXERCISE

## BACKGROUND:

- Your team will act as a company which delivers products (beads) to a large number of customers.

- The president of your company (the facilitator) has many years of experience in running the company. He inherited the company from his father ten years ago and has worked here for twenty-five years.

- Your company has just begun to implement TQM and your team was one of the first trained. The company expects a lot from you.

- Your company's supplier of product(beads) has been supplying you with this product for thirty-seven years.

- The beads cost your company 1 cent each and you sell them in "lots" of 100 for $ 2.00 per lot.

- Your company is under price pressure from a competitor in Mexico who is selling beads for $1.85 per lot.

# THE "BEAD" EXERCISE

## FACILITATOR'S INSTRUCTIONS:

1. Introduce this exercise as an opportunity for the class to gain some experience in using several of the statistical tools of TQM as well as to gain experience in processes, teamwork and other TQM initiatives.

2. Ask for volunteers to be the four operators, two inspectors and the chief inspector (a total of seven will be needed). If less than seven are available you may have inspector #2 act as the chief inspector and then reduce the number of operators as required. Those class members who are not one of the volunteers should observe closely and actively participate in all the discussions.

3. Instruct the class not to share this game with others who may later take the class so that future groups will have the opportunity to have the same learning experiences.

4. Make sure that the team has all the supplies it needs:
    a. Jar of beads
    b. Set of measuring cups
    c. "Data" forms
    d. Control charts
    e. Histograms
    f. A copy of the exercise background
    g. A copy of the exercise preparation
    h. A copy of the exercise product/objectives
    i. A copy of the exercise process definition

5. Instruct the team to start the exercise.

6. Provide assistance as required in helping the team fill out the different forms and charts.

C:BEAD6

7. When the Chief Inspector provides you with the data from the first cycle, talk with the entire team. Exhort them to do better. Remind them of the need to reduce costs to meet the competition, the need for everyone to do their part for the company, and especially the need for the operators to produce defect free product. Praise the inspectors for making sure the defects were reported correctly.

8. Ask the team if they are meeting the objectives. Lead a discussion on the objectives and provide suggestions on how the team can determine if they are meeting the objectives. **Do not** tell them how to do it.

9. If anyone suggests changing the process, tell them that your "dear departed" father would turn over in his grave if we changed something. Let them know that it has worked for twenty-five years.

10. Instruct the team to go through another cycle.

11. After the results of the second cycle are reported, take the operator who had the most orange beads aside and tell her/him (within earshot of the others) that he has to do better. Let him/her know that their future with the company depends on the number of orange beads they are getting.

12. Ask for the data regarding the company objectives.
    a. How long does it take to deliver a customer's order?
    b. Is the company making a profit?
    c. What do they recommend that we charge for each "lot?"

13. Take this opportunity to lead the class in flow charting the process if they haven't already done so.

14. Again resist any discussion regarding change.

15. Instruct the class to complete two more cycles before reporting back to you.

C:BEAD6

16. If, after the fourth cycle, the team hasn't empowered themselves, lead them on a discussion as to what they feel needs to be done. You can tell them you've just finished reading the book, **Zapp**, and you see that you've been wrong about not letting them have a voice in their work.

17. Lead the team to make process improvements using the process flow chart as a tool to find unnecessary or redundant operations.

18. Some of the suggested improvements could be:
    a. Remove all the orange beads from the jar.
    b. Go back to the supplier of the beads and have them insure no orange beads show up in future shipments. (You might even suggest working with this supplier to help them implement TQM.)
    c. Eliminate inspectors.
    d. Combine inspector's jobs with operators.
    e. Prepare a "lot" ahead so that you can meet the one minute requirement for delivery to the customer.
    f. Modify the measuring cup or use some other method to get beads out of the jar.
    g. (There will other good suggestions!)

19. The ideal process would be a two step process:
    a. Get the beads out of the jar.
    b. Put the beads in the "cup."

    What does it cost to ship a few extra beads instead of counting? Reducing the process variance will minimize the number of extra beads shipped.

20. Determine if the class has met the company's three objectives. Have them provide their numbers for all three objectives?

C:BEAD6

21. Ask the class to describe how they felt when you exhorted them the first time. Ask the individual operator that you singled out how they felt when you threatened to "fire" them. This should lead to a good discussion on empowerment, Deming's points on eliminating exhortation and fear and Glasser's basic needs.

22. After sufficient discussion, explain to the class that they should have had an opportunity to gain experience with many different tools and initiatives of TQM. Go over the list of TQM Initiatives Demonstrated and the list of TQM Tools Demonstrated from the first page of the exercise.

C:BEAD6

# THE "BEAD" EXERCISE

## PREPARATION:

1. Organize your team. The team will be made up of four operators, two inspectors and one chief inspector.

2. Find a suitable place to conduct the exercise. (A clean table is best.)

3. Obtain all the materials required for the exercise:

    1) a jar with 900 white beads and 160 orange beads
    2) four plastic measuring cups
    3) a "data" form
    4) two "control" charts
    5) two histograms

# THE "BEAD" EXERCISE

## PRODUCT:

- A group of at least 100 white beads (no orange beads allowed) in the "cup" measuring cup ready for delivery to your customer. Any "lot" with less than 100 will be returned to you. Any "lot" with an orange bead will be returned. (The orange beads are defects.)

## OBJECTIVES:

1. Ship defect free product to your customer within one minute after receiving the order.

2. Make a profit for your company.

3. Reduce your price to meet or beat your competition.

# THE "BEAD" EXERCISE

## PROCESS DEFINITION:

OPERATOR:

1. Pick up the jar of beads (with the top on it) and shake it 3 times.

2. Remove the lid from the jar.

3. Reach in the jar with a measuring cup and remove a quantity of beads.

4. Count the beads. (note: at any time in the process, dropped beads must be picked up and put back into the jar)

5. Record the number of orange beads and the number of white beads on the "data" form.

6. Hand the white and orange beads plus the "data" form to Inspector #1.

INSPECTOR #1:

7. Verify the number of white beads and orange beads. Correct the "data" form if there is an error.

8. Hand the white and orange beads plus the "data" form to Inspector #2.

INSPECTOR #2:

9. Verify the number of white beads and orange beads. Correct the "data" form if there is an error.

C:BEAD5

10. Return the white and orange beads and the "data" form to the operator.

OPERATOR:

11. Set aside any orange beads for return to your supplier.

12. Return any white beads in excess of 100 to the jar. Get any additional white beads you need from the jar in order to add to the "lot" to make 100.

13. Place the "lot" of beads into the "cup" measuring cup.

14. Dump the beads from the measuring cup back into the jar. (Do not count this as a step in the process. It is only done to have enough beads to complete the exercise.)

REPEAT:

15. Repeat steps 1 through 14 for each of the other 3 operators.

INSPECTOR #2:

16. After step 10 is completed for the last operator, give the "data" form to the Chief Inspector.

C:BEADS

CHIEF INSPECTOR:

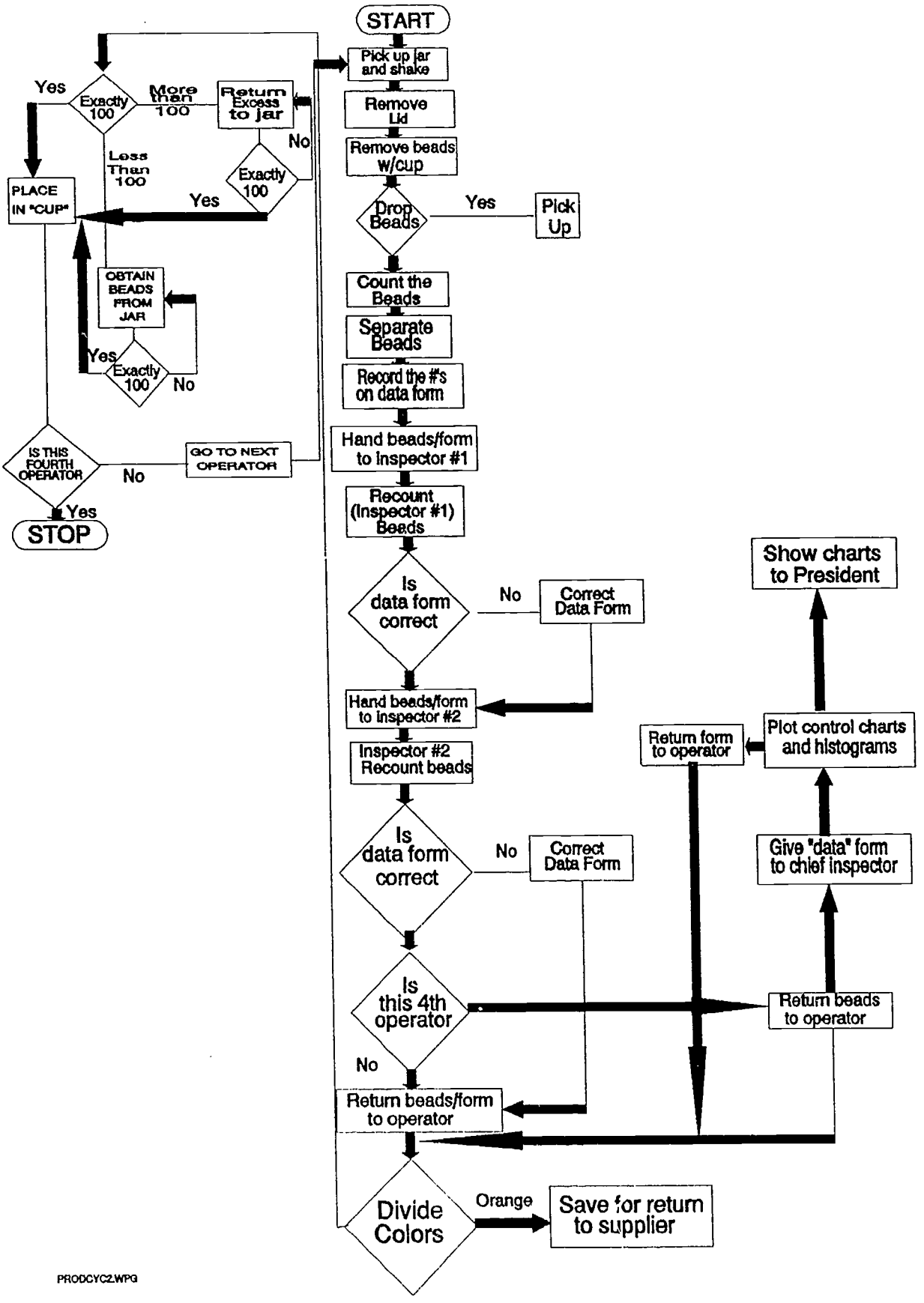
17. Record the number of orange beads for each operator on a control chart and a histogram.

18. Record the number of white beads for each operator on a control chart and a histogram.

19. Return the "data" form to the operator.

20. Take the control charts and the histograms and show them to the president of the company.

C:BEAD5




PRODCYC2.WPG

# DATA FORM

**CYCLE # _____**

| OPERATOR # | # BEADS WHITE | # BEADS ORANGE | INSPECTOR # ONE | INSPECTOR # TWO |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| CHIEF INSPECTOR | | | | |

# DATA FORM

**CYCLE # _____**

| OPERATOR # | # BEADS WHITE | # BEADS ORANGE | INSPECTOR # ONE | INSPECTOR # TWO |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| CHIEF INSPECTOR | | | | |

C:BEAD8

# TOTAL QUALITY MANAGEMENT (TQM)

## "THE CUBE" TEAM EXERCISE

CONTENTS:

# COMPETENCY PORTFOLIO

## ("THE CUBE" TEAM EXERCISE)

| COMPETENCY | TOTAL QUALITY LEARNING MATRIX | | | | | |
|---|---|---|---|---|---|---|
| | KNOW-LEDGE | KNOW-HOW | WISDOM | | | |
| | KNOW-LEDGE | COMPRE-HENSION | APPLICA-TION | ANALYSIS | SYNTHESIS | EVALUA-TION |
| CUSTOMER SATISFACTION | X | X | X | | | |
| EMPLOYEE EMPOWERMENT | X | X | X | X | X | |
| TEAMWORK | X | X | X | X | X | X |
| SELF-DIRECTED WORK TEAMS | X | X | X | X | X | X |
| ELIMINATION OF WASTE | X | X | X | X | | |
| PROCESSES | X | X | X | X | | |
| REDUCED CYCLE TIME | X | X | X | X | | |

# "THE CUBE" TEAM EXERCISE

## LEARNING POINTS:

1. The student will gain the opportunity to perform as a member of a self-directed team.

2. The student will gain experience in team development and conflict resolution.

3. The student will also gain "hands on" experience in working with the customer to gain customer satisfaction.

4. The student will have the opportunity to document a process and make process improvements in order to eliminate waste.

# "THE CUBE" TEAM EXERCISE

## TQM PRINCIPLES DEMONSTRATED:

- Teamwork
- Self-Directed Work Teams
- Customer Satisfaction
- Employee Empowerment
- Elimination of Waste
- Processes
- Reduced Cycle Time

# "THE CUBE" TEAM EXERCISE

## BACKGROUND:

- Your team will act as a company which produces "cubes" for the State of Texas to use in their new lottery game: "NUSHUS." (As in "baby needs a new pair of shoes.")

- Your company is one of several companies producing these cubes for the state.

- Your company will be made up of:

    1) a manager
    2) an observer
    3) associates

- Your company has just begun to implement self-directed work teams and is using your team as a "pilot" project to determine the effectiveness of these teams.

- Your objective is to make as many cubes as possible for the State of Texas during the allotted time.

- You may buy as many supplies as you need, but all purchases are "cash on delivery."

# "THE CUBE" TEAM EXERCISE

## PRODUCT:

Each two inch cube delivered to the State of Texas is considered a product. The product must meet the State's quality standard. Your team will be paid upon delivery of each cube.

## OBJECTIVES:

1. Deliver as many "quality" products to your customer as possible during the allotted time.

2. Make as much profit as possible for your company. (Profit is the cash your company has at the end of the allotted time period.)

# "THE CUBE" TEAM EXERCISE

## PRODUCT SPECIFICATIONS:

1. Each cube will have six sides with each side measuring exactly 2.0 inches.

2. All sides must be taped so that the cube will be able to roll.

3. The cube must be made of white card stock (67 #).

4. The cube can be either:

   A. Unfinished (no numbers written on the side), or
   B. Finished (numbers printed on each side)

5. Finished cubes can be in one of sixteen number combinations (these numbers will be printed on the sides of the cube):

   1. numbers 1 - 6
   2. numbers 7 - 12
   3. numbers 13 - 18
   4. numbers 19 - 24
   5. numbers 25 - 30
   6. numbers 31 - 36
   7. numbers 37 - 42
   8. numbers 43 - 48
   9. numbers 49 - 54
   10. numbers 55 - 60
   11. numbers 61 - 66
   12. numbers 67 - 72
   13. numbers 73 - 78
   14. numbers 79 - 84
   15. numbers 85 - 90
   16. numbers 91 - 96

cube3

# "THE CUBE" TEAM EXERCISE

## EXERCISE OUTLINE:

1. Project Introduction
2. Forming Teams
3. Providing Materials to Teams
4. Period 1 (30 Minutes)
5. Summary of Period 1 (15 Minutes)
6. Changing of Team Observers
7. Period 2 (1 Hour)
8. Summary of Period 2 (20 Minutes)
9. Team Summary Period (20 Minutes)
10. Final Team Summary Reports
11. Facilitator Summary

# "THE CUBE" TEAM EXERCISE

## FACILITATOR'S INSTRUCTIONS:

Note: Make sure all supplies and equipment are available before starting the exercise (see sheet titled "List of Materials").

Name tags for the "managers" and the "observers" should be prepared ahead of time.

1. Introduce this exercise as an opportunity for the class to gain some experience in working in teams as well as understanding the importance of knowing what your customer wants. In addition, the class will get some firsthand knowledge of self-directed teams and other TQM initiatives such as the elimination of waste and reduced cycle times.

2. Divide the class into teams. Each team should have at least five members, but not more than seven. Let the team decide how to divide into teams, but make sure there is as much diversity as possible within each team.

3. Ask for volunteers from each team to be the manager and the observer for that team. All other team members will be associates.

4. Instruct the class not to share this exercise with others who may later take the class so that future groups will have the opportunity to have the same learning experiences.

5. Go over the general rules with the entire class. Ask for any questions. Provide only clarifying instructions.

6. You will act as both the facilitator and the customer. Refer to the customer's instructions for your duties and responsibilities as the customer.

7. Make sure each team has a set of rules, a sheet of paper containing "the cube" template (or outline of the cube), and $200 in play money.

8. Instruct the teams to start the exercise. Tell them that they have thirty minutes to organize their activities and provide a "prototype model for the customer to approve. They should also have a brief outline of their manufacturing process for the customer's quality representative to review.

9. Start the timer for thirty minutes.

10. Provide assistance as necessary in order to answer questions or clarify the exercise.

11. Call all the observers together. Instruct them to do nothing but observe their team. They are to take notes so that they can report after the activity is over. They are not to participate in any of the actual work, nor are they to offer advice.

12. Next, call all the team managers together. (This should be done within ten minutes after starting the timer.) Ask each manager if they have any questions. Make sure that the managers know that they must have a prototype cube and a written description of their process available at the end of the thirty minute activity period.

    If someone comes to you during this period for supplies or to ask you questions as the "customer," excuse yourself and leave the managers so you can perform your other duties.

13. Provide supplies and equipment at any time to members of the teams. Use the price list provided. Make sure that the supplies and equipment are paid for as they are given out.

14. Stop the exercise after the thirty minutes have ended. Each team should have provided you with a prototype cube and a process description by this time or at this time. Make sure that each cube and process description are acceptable.

15. Refer to the sheet titled "Summary of Period 1"

16. Prepare to begin "Period 2." During this one hour time period, each team is to produce as many cubes as possible.

17. Change "observers" within each team. The "managers" will keep the same roles.

18. Instruct the teams to begin.

19. Start the timer for one hour.

20. Call the "observers" together. Give them a copy of "Observer: Period 2" to use. They are to take notes so that they can report after the activity is completed. They are to focus on: 1) team development, 2) conflict and conflict resolution, 3) roles and styles that different team members play, 4) the amount of empowerment (self-direction) that the team exhibits, 5) the effectiveness of team communications, and 6) what roles did the "manager" play.

21. Next, call all the team "managers" together. Remind them that the objective of the exercise is to: 1) deliver as many "quality" products to your customer as possible and 2) make as much profit as possible for your company. Tell them that you would like to have a status report at the end of thirty minutes that will let you know how many cubes have been delivered and how much money their team has at that time.

    If someone comes to you during this period for supplies or to ask you questions as the "customer," excuse yourself and leave the managers so you can perform your other duties.

22. Call the team "managers" back together after thirty minutes of Period 2 have elapsed. Ask them how many cubes they have delivered and how much money they have. Give them time for discussion.

Remind them that the exercise will end promptly after one hour and that they will receive money for only those cubes that have been accepted by the customer at that time.

23. Stop the exercise after the hour has ended.

24. Refer to the sheet titled "Summary of Period 2."

25. Ask each team to spend some time together to summarize "The Cube" team exercise. Give each team a sheet entitled "The Cube: Team Summary."

26. Allow twenty minutes for the teams to work on their summaries.

27. After twenty minutes, call everyone together to have a period of final discussion.

28. Ask for volunteers from each team to report on their summaries. Discuss among the group as appropriate.

29. Summarize, in your own words, after all the teams have reported. You may want to refer to the sheet titled "Facilitator's Summary" for ideas.

# "THE CUBE" TEAM EXERCISE

## LIST OF MATERIALS:

1. Enough name tags with "manager" and "observer" written on them so that each team can have one.

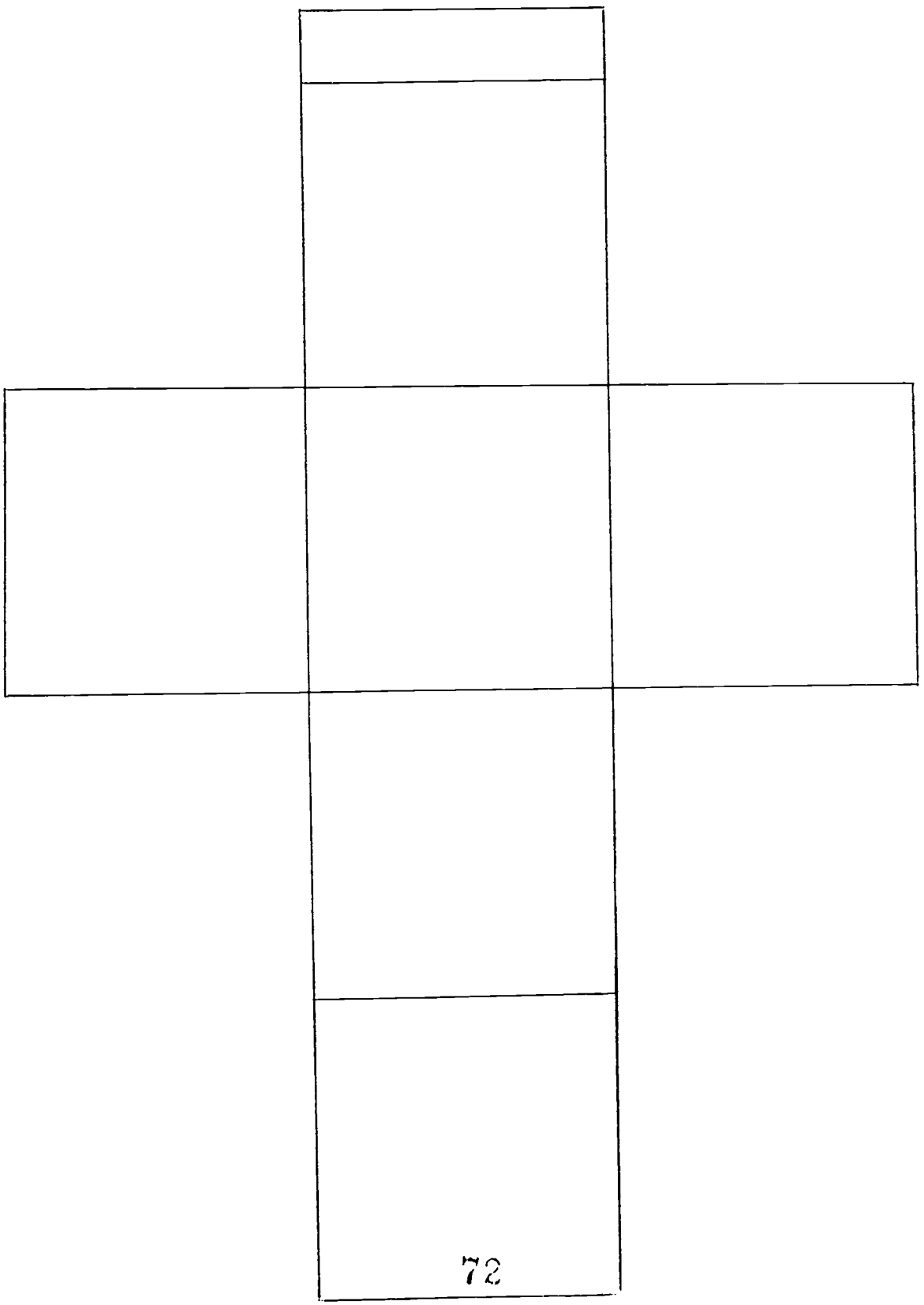
2. Supplies:
   - Paper (8 1/2" x 11" card stock '67#')
   - Tape
   - Rulers
   - Scissors
   - Pencils
   - Play Money

3. For the Facilitator: Copies of:
   - Exercise Outline
   - Summary of Period 1
   - Summary of Period 2
   - Price Sheet
   - Customer's Instructions
   - Cube Delivery
   - Facilitator's Summary
   - Enough copies of "Observer: Period 2" to give to each observer during Period 2.

4. At the Beginning of the Exercise, Each Team will Receive Copies of:
   - "The Cube" Template
   - Product and Objectives
   - Background
   - Product Specifications
   - "The Cube" Team Summary
   - Price Sheet

5. During Period 2, Each Observer will Receive a copy of:
   - Observer: Period 2

# "THE CUBE" TEMPLATE



# "THE CUBE" TEAM EXERCISE

## PRICE SHEET:

### PRICE RECEIVED:

| | |
|---|---|
| A. Unfinished Cube | = $ 10 |
| B. Finished Cube | = $ 20 |

### COSTS:

A. Supplies:

| | |
|---|---|
| Paper (per sheet) | = $ 10 |
| Tape (per roll) | = $ 20 |
| Pencil (each) | = $ 20 |

B. Equipment:

| | |
|---|---|
| Scissors (per pair) | = $ 50 |
| Ruler (each) | = $ 20 |

# "THE CUBE" TEAM EXERCISE

## THE "CUSTOMER'S" INSTRUCTIONS:

1. Do not provide any information to the teams unless they ask you specific questions. It is not up to you, the customer, to make your requirements know to the suppliers, "the teams," until they ask you. It will be hard for you to keep this information to yourself, but it is necessary in order to make this exercise as realistic as possible.

2. Each cube must be exactly 2.0 inches on each side.

3. Reject any cubes that are not perfectly square or that do not have well taped edges.

4. Accept the "finished" cubes in numerical sequence. The first "finished" cube will have the numbers 1-6 on it, the second cube will have the numbers 7-12 on it, etc.

   Another cube with the numbers 1-6 on it will not be accepted or paid for until all sixteen (16) cubes with the numbers from 1-96 are received.

   Note: A form entitled "Cube Delivery" is provided to assist you in keeping track of the cube receipts.

5. The cubes must be delivered in this order, no matter which team delivers the cube. (For example, if Team 1 delivers a cube with the numbers 55-60 on it and Team 3 wants to deliver a cube with the same numbers or lower numbers, it will be rejected.) This will force the teams to coordinate their deliveries.

6. If an "unfinished" cube is delivered, you (the customer) will immediately put the next available set of numbers on the cube before accepting another cube. (For example, if the last cube received had the numbers 19-24 on it, you would put the numbers 25-30 on the "unfinished" cube you just received.) This could cause some delivery problems for the teams. Again, this should encourage team coordination.

7. Pay the teams $10 for each "unfinished" cube and $20 for each "finished" cube when you accept them. You will not make cash advances.

# "THE CUBE" TEAM EXERCISE

## CUBE DELIVERY:

| Numbers | Set of Cubes | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th |
| 1 - 6 | | | | | | | | |
| 7 - 12 | | | | | | | | |
| 13 - 18 | | | | | | | | |
| 19 - 24 | | | | | | | | |
| 25 - 30 | | | | | | | | |
| 31 - 36 | | | | | | | | |
| 37 - 42 | | | | | | | | |
| 43 - 48 | | | | | | | | |
| 49 - 54 | | | | | | | | |
| 55 - 60 | | | | | | | | |
| 61 - 66 | | | | | | | | |
| 67 - 72 | | | | | | | | |
| 73 - 78 | | | | | | | | |
| 79 - 84 | | | | | | | | |
| 85 - 90 | | | | | | | | |
| 91 - 96 | | | | | | | | |

cube15

# "THE CUBE" TEAM EXERCISE

## SUMMARY OF PERIOD 1:

1. Ask for a volunteer team observer to comment on their team's activities. Special emphasis should be on the stages of team development:

| | | |
|---|---|---|
| Stage 1: | Forming | (Getting started) |
| Stage 2: | Storming | (Going in circles) |
| Stage 3: | Norming | (Getting on course) |
| Stage 4: | Performing | (Full speed ahead) |

   Ask the observer which stage their team has reached during Period 1.

   Continue this until all team observers have had a chance to comment.

2. Ask for volunteers among the team managers to comment on their experiences. Did they have any frustrations? Get each manager to comment.

3. Ask for volunteers among the team members to comment.

4. Keep this discussion period to about fifteen minutes, if possible.

# "THE CUBE" TEAM EXERCISE

## SUMMARY OF PERIOD 2:

1. Ask each team to tell you the number of cubes they have delivered and the amount of money they have at the end of the exercise. List these on the blackboard, a chart, or a transparency.

2. Ask for a volunteer team observer to report on their team's activities.

   A. What stage of team development did their team reach?
   B. Was there conflict within the team? If so, how did the team address this conflict?
   C. Did each team member fit into one of the team styles or roles?
   D. How much self-direction did the team have? Why?
   E. How effective were team communications? Why?
   F. What role did the team manager have?

   Continue this discussion until all teams have reported.

3. Ask for volunteers among the managers to comment on their experiences. Were they frustrated? How much self-direction existed in their team? What was their role on the team?

   Let each manager comment.

4. Ask for volunteers among the team members to comment.

5. Keep the discussion period to about twenty minutes, if possible, but make sure that sufficient discussion has occurred.

# "THE CUBE" TEAM EXERCISE

## OBSERVER: PERIOD 2:

1. Which stages of team development has your team achieved?

   Stage 1: Forming (Getting Started) _____
   Stage 2: Storming (Going in Circles) _____
   Stage 3: Norming (Getting on Course) _____
   Stage 4: Performing (Full Speed Ahead) _____

2. Did conflict occur within your team? YES NO
   If yes, was it constructive? YES NO

   What method was used to resolve the conflict?
   a) denial, b) smoothing over, c) power, d) compromise, or e) problem solving

3. Who on your team demonstrated the following team-player styles:

   A) Contributor: _____
   B) Collaborator: _____
   C) Communicator: _____
   D) Challenger: _____

4. Who on your team demonstrated the following roles:

   A) Team Leader: _____
   B) Team Facilitator: _____

5. How much self-direction (empowerment) did the team demonstrate?

6. How effective were team communications? Why or Why not?

7. What role did the manager play on the team?

cube16

# "THE CUBE" TEAM EXERCISE

## "THE CUBE" TEAM SUMMARY:

1. Discuss the stages of your team's development. Did you get through all four stages (forming, storming, norming, and performing)? Why/Why not?

2. Did each member feel that they were a part of the team? Why/Why not?

3. How much self direction did the team have? What led to it? or Why do you think your team had so little?

4. If you did this exercise again, what would you do differently to make your team more effective?

5. What was your team's overall strategy at the beginning? Did it change? If so, why and how?

# "THE CUBE" TEAM EXERCISE

## FACILITATOR'S SUMMARY:

- Most teams will only develop to the stage of "storming" or "going in circles." Some may progress to the "norming" stage where they will begin to get on course.

- The teams and managers probably found it very difficult to take on their new roles in a self-directed team environment. This effort takes more time than this exercise allowed, since it is built on trust.

- The managers were taken away from the teams to add frustration, but also to present "real world" situations where the "boss" is not around. Hopefully, this caused the teams to become more self directed.

- Did the different teams decide to have a collaborative effort? There may have been several teams that decided to work together or none may have done so. By working together as a much larger team, the overall results should have been better than with individual teams. (Note that there were no rules that would keep the class from collaborating.)

- How well did the teams respond to "new news" such as the customer only being willing to accept the cubes sequentially?

- If conflict arose in the teams, it was probably resolved by the use of "power" or "compromise" due to the time constraint of the exercise. Unfortunately, this is often the case and there never "seems" to be enough time to resolve the conflict properly.

# TQM COURSE

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