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Title: Determine the Plan for the Implementation of TQM in the Microcomputer Labs of PSU

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Abstract: We present a plan to implement Total Quality Management in the Microcomputer Labs of PSU. Current problems in the labs were identified, with the major concern being the hassle in the check in/out process. A detailed flow diagram was developed to clarify the process.

Determining the Plan for the Implementation of TQM in the Microcomputer Labs of PSU

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EMP-P9334

EMGT 510

TOTAL QUALITY MANAGEMENT II

TERM PROJECT

DETERMINING THE PLAN FOR THE IMPLEMENTATION OF TQM IN THE MICROCOMPUTER LABS OF PSU

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1. INTRODUCTION

This project presents a plan to implement Total Quality Management in the Microcomputer Labs of Portland State University. During the course of this study, some of the current problems in the microcomputer labs have been identified through the input received from the employees.

Based on the feedback obtained from the staff, these problems have been prioritized. The major concern then turned out to be the hassle in the check in/out process.

In order to understand the check in/out process better, a detailed flow diagram has been developed. This has shown that there are actually three main processes handled at the desk: check in, answering questions, and check out.

2. TOOLS USED

<u>Flow diagrams:</u> As described in publications of Juran Institute [1], a flow diagram is a graphic representation of the sequence of steps performed in producing some output. In the context of problem solving, quality improvement teams use flow diagrams to:

- Develop a common understanding of an overall process.
- Uncover potential problems, bottlenecks, unnecessary steps, and rework loops in the process.
- Guide discussion on identifying problems, theorizing about root causes, discussing potential solutions, and holding the gains without having to physically observe the process.

The process starts when the user comes to the front desk and ends when user is relieved. In the process that has been observed, there are three sub processes:

1. User Check In Process; As it is seen in Figure 1, this process consists of six major steps. Analysis of this flow diagram indicated that there were few bottlenecks in this sub-process. The major bottleneck was identified to be the "waiting activity of the user in front of the desk".

2. Question Asking Process; This process is illustrated in Figure 2. During this process there are three causes identified resulting the waiting activity of the user. This activity was again observed to be a bottleneck. The causes, mentioned above, are:

   i. the absence of the supervisor on the floor
   ii. the absence of the attendants at the desk area
   iii. the lack of knowledge of the attendant

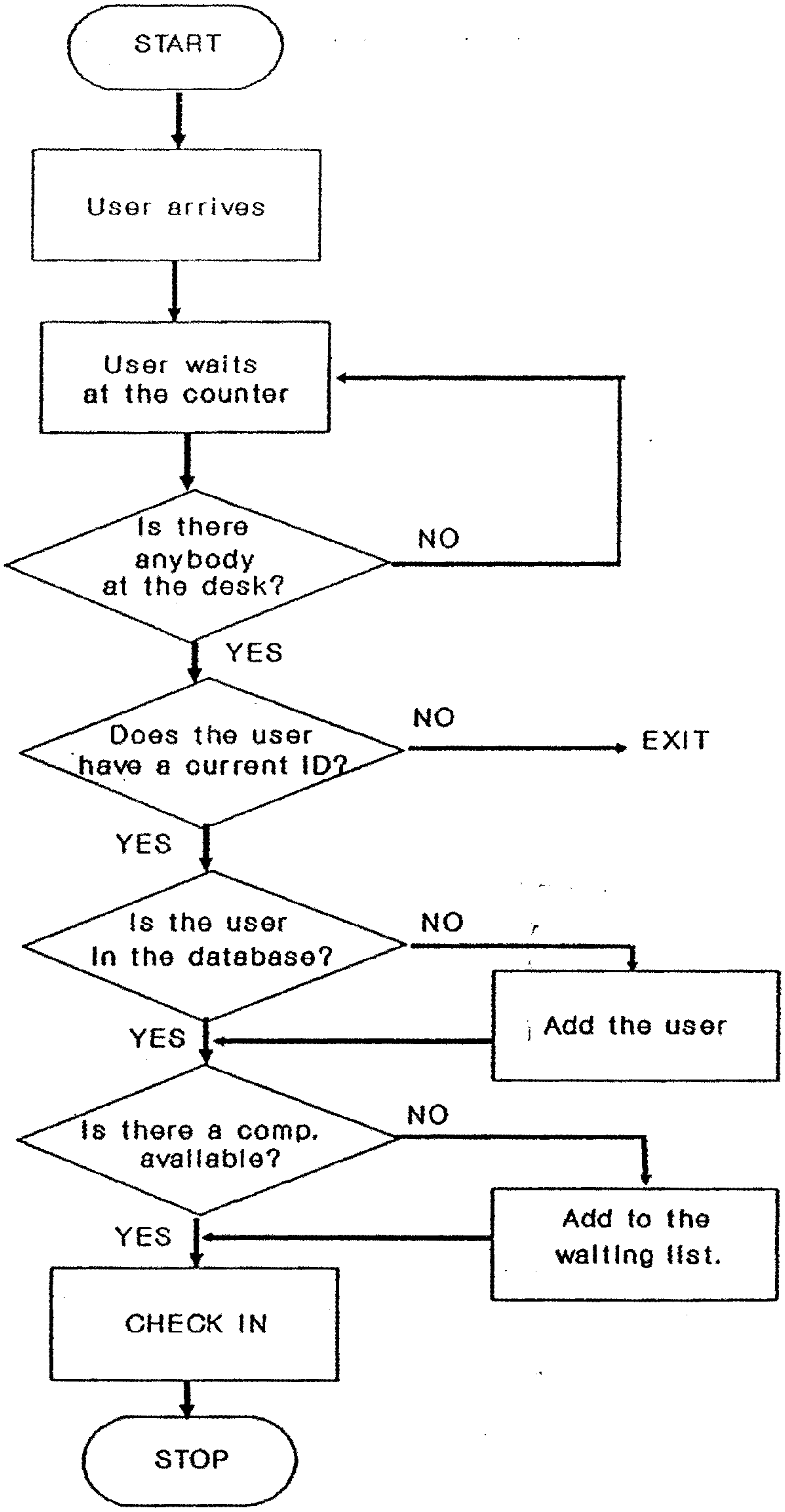


Figure 1 Check In Process

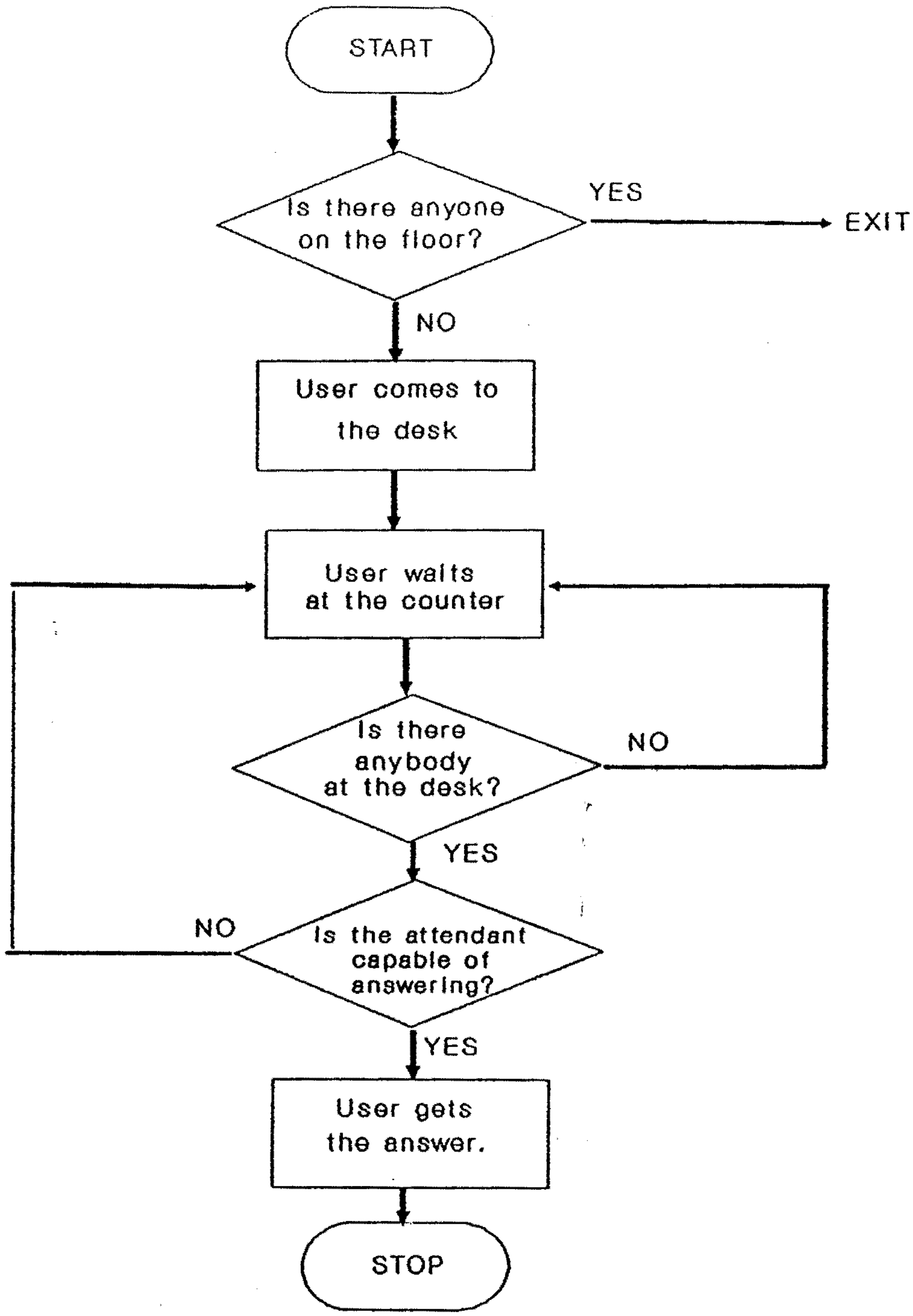


Figure 2. Question Process

3. User Check Out Process; This process includes four steps, as shown in Figure 3, one of which results in a bottleneck at the user waiting activity. The reason for the occurrence of the bottleneck was identified as the absence of the attendants at the desk area.

After identifying the problem occurring in the process, an analysis of the problem has been accomplished by utilizing the cause and effect diagrams.

Cause and Effect Diagrams: As explained in the publications of Juran Institutes [2] , this tool has three prominent basic features:

- It is a visual representation of the factors that might contribute to an observed effect or phenomenon that is being examined.
- The interrelationships among the possible causal factors are clearly shown. One causal factor may appear in several places in the diagram.
- The interrelationships are generally qualitative and hypothetical. A cause effect diagram is usually prepared as a prelude to developing the data needed to establish causation empirically.

The most important consideration as defined in the Juran Institute publications [2], is the clear understanding of the cause effect relationship. All possible sources of causation need to be considered. These are generally *what, why, when*, and *where* of cause and effect and should always be asked.

The major advantage of this tool as defined in the Juran Institute publications[2], lies in the fact that it focuses the attention of all people in the team on the specific problem at hand in a structured, systematic way.

The cause-effect table of the problem is presented below:

Long Waiting

. Lab Attendants

-knowledge

_lack of proper training

-availability

_sick

_brake

_shift change

..shift structure

..punctuality

. Supplies

-paper stock

-computer availability

-cartridge stock

-downtime frequency

.Procedures

-shift structure

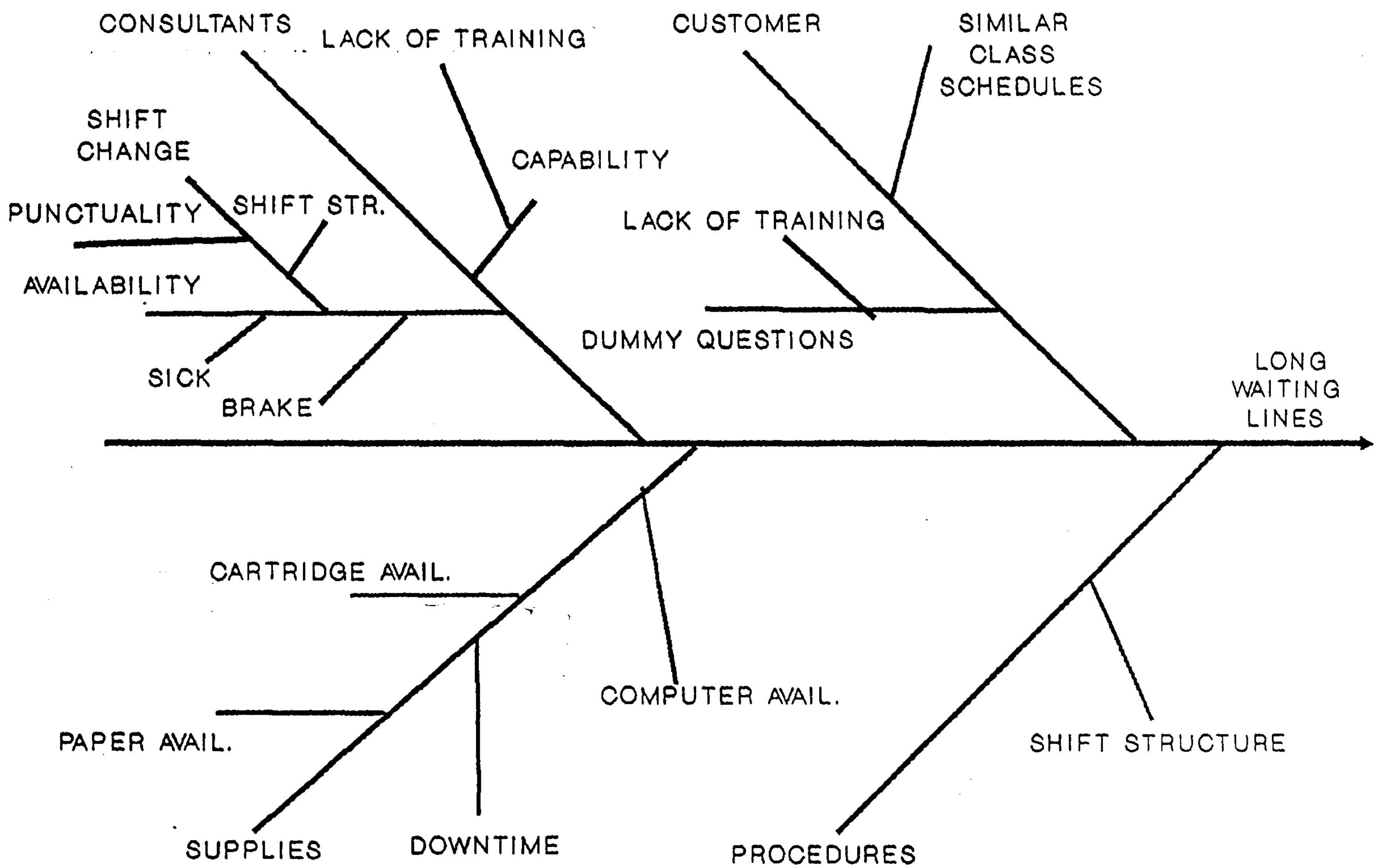
.Users

-similar class schedules

-dummy questions

_lack of proper user training

Figure 4. Cause-Effect Diagram



__Control Charts__ : Next step was to identify the appropriate control tool. As we had observed, the data we had did not let us make the suitable arrangements to be able to come up with the special and common causes of variation. Also, the nature of the data set we had, forced us to use attribute control charts, because we had either the "on-time" employees or "late" employees, which fits into the definition of the attribute control charts. Besides, our subgroup sizes were not constant, which made us focus on "p chart for variable subgroup sizes", so as to plot our data on a graph and detect whether our process was in control or not.

Consequently, we utilized a "p chart for variable subgroup sizes" so as to check our data set. The charts can be seen in Figures 5 and 6

Julien Dates	75	76	77	78	82	83	84	85	86	89	90	92	93	94	95
Number Inspected	16	21	11	10	5	5	4	3	1	14	4	10	8	4	19
Number Nonconforming	6	4	4	1	1	1	3	2	1	1	1	2	4	1	2
Fraction Nonconforming	0.38	0.19	0.36	0.10	0.20	0.20	0.75	0.67	1.00	0.07	0.25	0.20	0.50	0.25	0.11
p =	0.27														
UCL	0.60	0.56	0.67	0.69	0.87	0.87	0.94	1.04	1.60	0.63	0.94	0.69	0.74	0.94	0.58
LCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Upper Zone C	0.38	0.37	0.41	0.41	0.47	0.47	0.49	0.53	0.72	0.39	0.49	0.41	0.43	0.49	0.37
Lower Zone C	0.16	0.17	0.14	0.13	0.07	0.07	0.05	0.01	0.00	0.15	0.05	0.13	0.11	0.05	0.17
Upper Zone B	0.49	0.47	0.54	0.55	0.67	0.67	0.72	0.78	1.16	0.61	0.72	0.56	0.59	0.72	0.48
Lower Zone B	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.07

Julien Dates	96	97	98	99	100	102	103	104	106
Number Inspected	16	22	22	12	8	19	14	19	17
Number Nonconforming	4	8	7	4	1	2	6	6	5
Fraction Nonconforming	0.25	0.36	0.32	0.33	0.13	0.11	0.43	0.32	0.29
UCL	0.60	0.56	0.56	0.66	0.74	0.58	0.63	0.58	0.59
LCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Upper Zone C	0.38	0.37	0.37	0.40	0.43	0.37	0.39	0.37	0.38
Lower Zone C	0.16	0.18	0.18	0.14	0.11	0.17	0.15	0.17	0.16
Upper Zone B	0.49	0.46	0.46	0.53	0.59	0.48	0.51	0.48	0.49
Lower Zone B	0.05	0.08	0.08	0.01	0.00	0.07	0.03	0.07	0.06

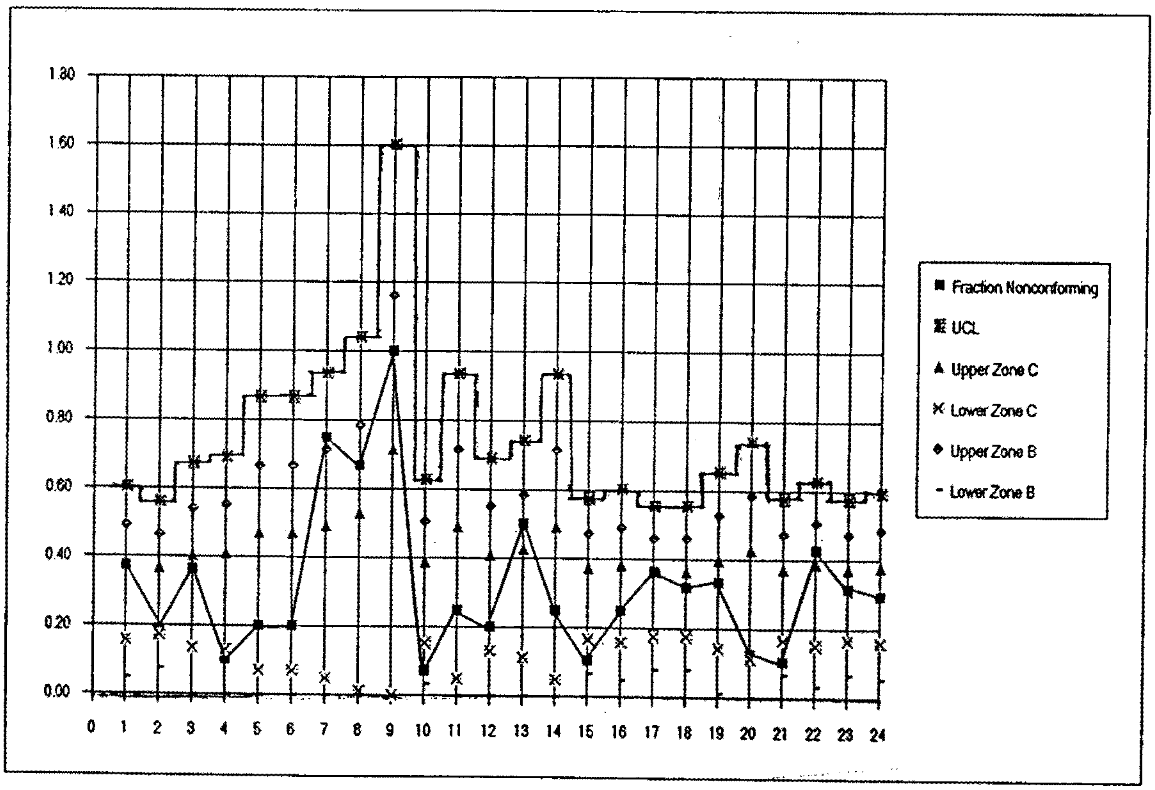


Figure 6. Plot excluding days having no late shifts