



**A COMPUTER ASSISTED INSTRUCTION FOR
QUALITY CONTROL SYSTEM**

by

Ms. Teetima Kusalanukhun

**A Final Report of the Three - Credit Course
CE 6998 Project**

**Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer and Engineering Management
Assumption University**

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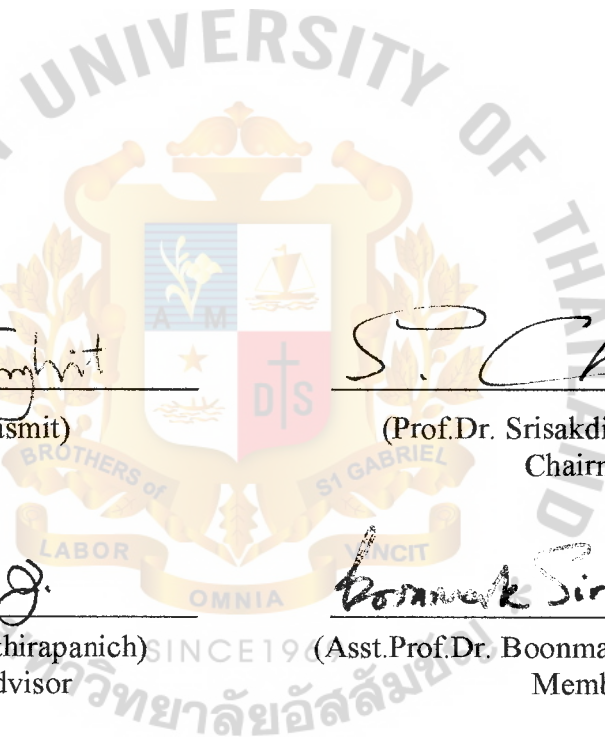
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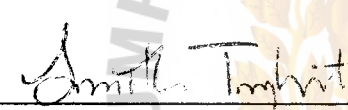
Project Advisor Mr. Smith Tungkasmit

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The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

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(Mr. Smith Tungkasmit)
Advisor



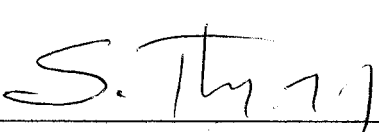
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April 2001

ABSTRACT

This project is a program development for a Computer Assisted Instruction system on the topic of “Quality Control System.” The program can run on a microcomputer with Microsoft Windows.

The program consists of 3 topics:

- (1) Fundamental Quality control
- (2) Quality Control Techniques
- (3) Statistic Quality Control

In order to demonstrate its effectiveness, The Computer Assisted Instruction is applied to a real –world factory case study. The intended users are people involved in quality control department in the factory. A training program in Quality Control is needed. Consequently, employees should concentrate on Quality Control to improve their knowledge and skill in the organization.

ACKNOWLEDGEMENTS

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I. INTRODUCTION

1.1 Introduction

Nowadays, many businesses have operated to compete both in local and international markets. It makes entrepreneurs must improve their goods and services through production in order to achieve efficiency and get high quality of the product to be able to compete in the market. Productivity an improvement is important method that industrialists should to utilize for the survival of their business. So many companies try to develop themselves all the time and find the strategies for improvement. For strategy “quality first” is the strategy that producers take as a policy in their company to achieve the goal that is to produce only quality goods and to give only satisfaction service. Companies should realize that quality is the most important thing in management, moreover in industrial business, each product must have quality and be checked before delivering to customers. If quality is made the global driving force, then the customers will obtain the best value possible and use your product. This maximizes profit by focusing on increased revenue.

Quality control is the most effective factor a company can use in the battle for customers. To be competitive, we must satisfy the customer. In order to be more competitive, we must delight the customer. Quality is defined here as the measure of customer delight. Note that customer satisfaction is a region on the scale of customer delight. To delight the customer, we must design for quality. Consequently quality control is the method that top management, middle management through lower management should have knowledge to improve their organization.

At present, Training program is necessary for most businesses whose administrators should be interested in new system because employees come from different backgrounds. But in small and medium enterprise, they are not very interested

because the system requires some outside experts and that causes quality a lot of money. At the moment, all kinds of business should provide their employees with a training program because of their exporting business. Employees should have basic knowledge about quality control. Both engineers and supervisors should be trained, but that alone is not enough, employees, too. Development employees have to be well trained in quality control. So the methodologies to improve employee's skill have many sources for learning such as books, asking expertise, and training program.

Computer Assisted Instruction is the method for training that uses computer program by presenting and teaching by computer, which is appropriate in every level of management in production. Using computer to apply for learning by you and management training is appropriate because computer program can create lessons that have both sound and picture. It makes learner can review their knowledge. Computer Assisted Instruction for training in industrial is not enough and there is a great need of trainers who have skill in quality control system.

Consequently, this project presents computer technology that creates program in Computer Assisted Instruction for quality control system. The program is developed in order to make employees understand the fundamental Quality Control System, Quality Control Techniques, and Statistic Quality Control in order to take the concept to apply in production and management in their industries.

1.2 Objectives

- (1) To develop Computer Assisted Instruction for quality control system.
- (2) To provide a better understanding of the concepts and implementation of quality control program.
- (3) Model of evaluation to improve and apply in production and increase productivity.

1.3 Scope

- (a) Support technology of Computer Assisted Instruction such as competent of program, equipment and using program.
- (b) Expand Computer Assisted Instruction for quality control system in:
 - (1) Fundamental Quality Control System
 - (2) Quality Control Techniques
 - (3) Statistic quality control
- (c) Test and evaluate from manager, supervisors, and engineers in quality control department.



II. LITERATURE REVIEW

2.1 Instructional Multimedia

Technology Multimedia is an integral part of most businesses. It becomes more available, affordable, and standardized, companies and educational institutions are turning to interactive multimedia as a part of their training program. A 1993 survey of the fortune 1000 companies conducted by a research firm found that “45 percent of larger companies are already using multimedia technologies to do a portion of their in house training.”

Instructional multimedia refers to applications designed to target specific learning objectives. It has been embraced in training environments because it combines the interactivity and management features of computer Assisted Instruction. The application may develop in many forms that also enhance training with transmission, delivery, and storage of interactive lessons through networks, telecommunications, and optical media.

2.1.1 Multimedia Planning and Development Suggestions

(Barron and Orwig 1995) The initial costs of multimedia instruction program are generally high and development time may be lengthy. Even though multimedia technology has many benefits for training, it is not appropriate for all media technology. A detailed needs analysis and investigation of other options is essential. Before embarking on multimedia project, consider these suggestions.

- (1) Join professional organizations. There are many professional organizations that focus on multimedia design and development. By joining these groups, you will have access to their publications, conferences, and the experience of experts in multimedia production.

- (2) Subscribe to professional and technical magazines and journals. There is a wealth of multimedia information in periodicals such as trade journals, technical magazines, and professional publications.
- (3) Attend professional conferences. Many professional's organizations sponsor technology conferences. By attending workshops and seminars at the conferences, you will see and hear about the latest developments in instruction media, meet others who are in the process of implementing multimedia, and gain insights on techniques and resources. Technology periodicals usually feature information about upcoming conferences.
- (4) Visit training sites at other locations. The best way to get ideas on integrating technology into yours program is to visit other sites. Most businesses are more than willing to share what they have learned.
- (5) Invest in personnel with expertise in multimedia development. There is a definite learning curve for technology. An inexperienced team will require substantially more time to complete a project.
- (6) Investigate commercial applications. It is costly and foolish to "reinvent the wheel" when creating a multimedia instruction program. Before producing an application from scratch, check to see if there are commercial produces available that would meet your needs.
- (7) Don't get carried away with bells and whistles. Because you have a multimedia computer that can play sounds and videos. It does not mean that you need to include them in every program.

2.1.2 Benefits of Instructional Multimedia

(1) Self Confidence

Whether or not there is a significant difference in the effectiveness of multimedia Instruction over conventional means, there is substantial evidence that students completing technology based programs have an improved sense of mastery of the materials.

(2) Reduced Training Time

Studies of the time required training employees with multimedia and Computer Aided Instruction has consistently found a reduction 30 percent or more over conventional training.

(3) Decreased Cost

Although the start-up costs for multimedia is high, multimedia training can be cost-effective over the long run used in education, military, and industry.

(4) Active learning

Multimedia involves students in active, rather than passive, learning through physical interaction and cognitive engagement.

(5) Encourage Explorations

Multimedia Instruction helps students develop mental models as the basic of future learning; create environments that permit sustained exploration by students and teachers; help students explore the domain from multiple perspectives; and develop integrated knowledge structures that help students transfer knowledge.

(6) Motivation

Technology can inspire students by making learning interactive and relevant. The students enjoy with technology also they stay for longer periods of time.

2.2 Computer Assisted Instruction (CAI)

Computer Assisted Instruction (CAI) has now been with us for more than a quarter of century. People everywhere are studying CAI lessons. Medical students are diagnosing illness of simulates patients. Factory workers are getting oriented to their jobs. CAI is attractive for learners from many sources such as in computers system, videodisks, expert system, and other technologies. Technology interacts with learners and with presentations to generate issues unique to computer-presented instruction. (Allessi and Trollip 1988).

Thus, CAI is more than the application of technology to instruction. Effective CAI is a synthesis of technology, theory and practice.

2.2.1 Evolution of Computer Assisted Instruction

Multimedia system is important in Computer Assisted Instruction. In 1950, scientists at the Massachusetts Institute of Technology designed the first CAI, using a mainframe computer. This led to CAI for staff development and training in many industries.

Computer technology advanced steadily during the 1960s. The precursor to today's computer monitors was the cathode-ray tube, which IBM introduced in 1964, followed in 1966 by the first computer system designed expressly for CAI.

CAI became well known when researchers at the University of Illinois initiated the PLATO project in 1960. Based on what had been demonstrated, in 1971 the National Science Foundation invested \$10 million in two CAI projects in PLATO

(Programmed Logic for Automatic Teaching Operations) system and TICCIT (Time-shares Interactive Computer Controlled Information).

The goal of PLATO was to demonstrate the technical feasibility, manageability, and economic viability of an extensive computer- based education network. High cost proved a significant barrier to adoption by other educational institutions. PLATO lessons produced achieve gains in mathematics, chemistry and biology. The aim of TICCIT was to demonstrate in community colleges That CAI could provide better instruction in Mathematics and English at lower cost than traditional instruction could. TICCIT also produced achievement gains among students in tradition classes. (Steinbery and Erlbaum 1999).

Although early efforts led to much enthusiasm for the potential of CAI, cost was a serious deterrent to its application. Access to mainframe systems with terminals was limited. Educational software was scarce and even of questionable quality. There are typical problems with new technology.

2.2.2 Defying Definition of Computer Aided Instruction

Today there is no established definition of CAI. Computers can assist instruction in many ways. They can actually present instruction, interacting with learners in tutor-like fashion, individually or in small groups. Computer-presented instruction embraces a wide range of techniques and can vary in complexity from simple drills to decision-making tasks.

CAI is an acronym for “Computer Assisted Instruction.” The computer assists by delivering an instructional program. Whether the instruction is delivered by microcomputer costing hundred of dollars or a mainframe system costing hundreds of thousands, if a computer delivers instruction, the process could be considered CAI.

CAI is the most common term for interaction of learners with a computer in a direct instructional role. It is any instance in which instructional content or activities are delivered via computer. CAI software purposes to teach some particular content in any of a variety of formal with or without any involvement of a human teacher.

CAI means computer-Assisted instruction applications (Merril 1987) that is individualized, interactive and guided.

- (1) Individualized; Instruction is individualized because the computer serves as tutor for one individual rather than as instructor for a group. CAI need not be confined to individual users and can be effective for learners working in pairs or small groups.
- (2) Interactive; CAI is interactive in that it involves two-way communication between learner and computer system. In some lessons the computers poses questions, the learner responds, and computer presents feedback.
- (3) Guided; CAI will guide by suggesting an appropriate range of values to select if the range is too narrow or adequate. The program presents their work and shows detail also asks questions to help understanding.

2.2.3 Major Characteristics of CAI

- (1) Interaction

In typical classroom group instructions, it is difficult at best for teacher to keep a learner actively engaged in learning process. With CAI, learners interact directly and continually with computer, responding to prompts and questions, receiving feedback to whatever they have done. The computer becomes a sort of private tutor. Computer Assisted Instruction largely removes the potential for learners merely to observe with out active participation.

(2) Flexibility

It is flexibility to teach virtually anything from higher-order thought processes such as problem solving skills to the relatively simple cognitive learning usually associated with stimulus-response theory. Trainers can use CAI for instruction that is integral to the on-going curriculum, to enrich or supplement basic instruction, or for remediation.

(3) Meeting learning needs

Trainers working one to one with learner adapt their instruction continuously based on the learner's responses, both in method and in content. CAI can provide instruction adapted to the current user of the software, which may vary greatly from the needs of the next users.

2.2.4 Differences between CAI and Others Modes of Instruction

Learning in group-paced situations such as listening to lectures, participating in discussions, and viewing films is different than learning from CAI lessons. Even learning with individually paced point media such as books and programmed instruction is significantly different than with CAI.

(1) Classrooms and CAI, classroom instruction differs from CAI in three ways.

They are:

- (a) Modes of communications. One major difference between classrooms and CAI is communication between a learner and instructor. In traditional classrooms, instructors talk much of the time. They also write on the board, draw diagrams, and display illustrations and communicate by nonverbal and physical actions. In CAI, the computer/instructor communicates almost exclusively in one mode visual. CAI can include oral presentations and interactive.

- (b) Instructor - learner interaction. An important aspect of classroom instruction is interactive between an instructor and learner. An instructor tries to monitor student's understanding by asking questions. In CAI, a computer instructor can monitor understanding by asking questions and evaluating responses. Other is computer cannot answer just any question posed by a learner. Instructors can usually answer learners' questions. If not, they can suggest resources for finding the answers.
- (c) Environmental factors. Environmental factors such as learner's expectations, opportunity to respond, acknowledgement of responses and pacing. Most of these factors are self-evident or common knowledge in one instructional mode but not in the other. In CAI, information about your performance is self-evident only in some lessons. Knowing how you compare to others is not self-evident. Nor is it generally easy or even possible to flip through a CAI lesson to see how much remains to be done. That information is usually available only if the lesson designer presents it on the display screen.

(2) Programmed Instruction and CAI

The general idea is that programmed instruction is individualized instruction in which brief sections of information are presented followed by questions. The student responds to questions and receives immediate feedback about the correctness of the responses. The difference is learner interaction with the lesson. In programmed instruction, a student may find the feedback when answer the questions. CAI can be programmed to judge

(3) Administrative strengths and cost effectiveness

CAI may be used without the participation of trainers, they can be employed during evening and weekends in locations where trainers are unavailable. It's also inexpensive to reproduce and distribute.

(4) Motivation

Many learners find CAI appealing, computers and computer applications can make students interested. Still others note efficiency associated with computerized instruction.

(5) Immediate feedback

Computer's ability can be evaluated instantaneously and responses pass human instructor's ability.

(6) Ease of record keeping

CAI lessons may be programmed to automate any or all aspects of record keeping for performance.

(7) Lesson Integrity

It's designed and covered relevant information. CAI may also be used to verify that instruction or learning actually took place.

2.2.6 Step Model for Developing Computer Assisted Instruction

(Tucker 1997) describes an eight-step model for development of Computer Assisted Instruction. This model is oriented directly toward computer delivery of instruction that simplify some of the activities involved the instructional development. The important feature of the model is that it contains steps specifically intended to foster creativity and to increase the likelihood that the developer will produce lessons that use the computer in new and more innovations. The following of eight steps;

(1) Define your purpose

When you set out to design and develop instruction, you usually know general purpose or goal. Considering learner knowledge and the hierarchical nature of the content you intend to train.

(2) Collect resource materials

Collecting resource materials includes gathering materials dealing with the subjects matter, with instructional development, and with your instructional delivery system. Resource materials generally include textbooks, reference books, original source materials, films and other individuals knowledgeable in particular area.

(3) Generate ideas for the lessons

It's an important step, we suggest procedures to encourage creative ideas in development process. Many designers get stuck at this early point, either spending too much time trying to come up with the perfect idea, or more frequently, giving up and going forward with mediocre idea. Brainstorming is one method to generate idea because it has proved to be a method that facilitates creativity and produces a list that will include some interesting and good ideas.

(4) Organize your ideas for the lesson

The outcome of brainstorming is along list of ideas that range in quality from very bad to very good. In this step you first eliminate the worst ideas and then begin ordering, detailing, and refining the ideas that are good. At this time you also make preliminary choices about instructional methodologies and factors.

(5) Produce lesson displays on paper

This step includes drafting the actual instructional messages, as learners will see them, such as information presentations, questions, feedback, directions, and prompts. It also includes preparing drafts of graphics presentations such as pictures, cartoons, graphs, and animations.

(6) Flowchart the lesson

A flowchart is a series of diagrams that describe in detail what operations a computer should perform and in what order it should perform them. Flowchart does not include the actual text and pictures for your lesson. It should include all details of the sequence of lesson components, such as information presentations, questions, and learner interaction and learner choices.

(7) Program lesson

Programming is the process of translating what you have on a paper into a series of instructions understandable to the computer. The program is produced directly from the flowchart and the storyboards. Although we make a number of suggestions on how to go about programming how to avoid errors, programs inevitably contains errors after they are written.

(8) Evaluate the quality and effectiveness of the lesson

In this last step, you evaluate the lesson with an eye toward how well the lesson looks and how well it works. You will determine lessons by using it yourself that is called lesson review. You will assess how well the lesson works by observing the results of real learners studying the lesson. This process includes both pilot testing and validation.

2.2.7 Major Classifications of Computer Assisted Instruction

(1) Tutorials

Basic information to be learned must be presented initially in some form. Traditionally, this presentation has taken the form of textbooks, lectures, videotapes, and other teaching system. Generally, it is assumed that the teaching system should make the learning experience interesting and effective.

In CAI, tutorials are generally used to present new information to learners' particulars skills, information or concepts. The instruction is designed to be self-contained that is the teaching and learning of all relevant information is accomplished with in the lesson. Lesson information may be further reinforced using computer-based or traditional teaching system, but tutorials should teach well-defined objectives thoroughly enough to eliminate the need for repetition through another teaching system.

(2) Drill and Practice

Drill and practice provide an opportunity to establish that learners are able to perform target skills, to provide feedback regarding performance, and perhaps to remediation those skills that students don't perform well and maximum interaction between learners and teachers.

In CAI drill and practice design provide practice for defined skills, immediate feedback to the learners for each response given, and usually some form of correction or remediation for incorrect responses. They avoid the problem of inadequate monitoring, unchecked error responses and postponed feedback.

(3) Simulation

CAI simulations approximate, replicate or emulate the features of some tasks, setting or context. Simulations are used when costs of alternative teaching system are prohibitively high, when it is impossible to study the concepts of interest in “real time.”

Simulations are also used to study the effects of experiments that cannot be observed by naked eye, due perhaps to the microscopic nature of the experiment or to the extreme speed or slowness of elements to be observed.

(4) Instruction games

CAI games use the same basic concepts, except the purposes are defined more specifically as part of teaching and learning context. Instruction games are high-motivational approaches to the reinforcement of already taught skills, concept, and information.

CAI games must retain instructional value as their primary goal; whereas several skills are typically used to play on instruction game, the focal point of game should be apply well-defined skills.

2.3 Authorware Program

Authorware is one of the higher end multimedia development tools. It was originally designed for creating interactive training and educational programs. Its strengths are found in these origins. Authorware allows you to program without the need to learn a programming language or script. It does this by using a flow chart model. It's as the most powerful authoring environment for interactive information. It can be used for interactive multimedia training and courseware. To support this, Authorware has facilities for student tracking functions, scoring, and record keeping.

Multimedia productions using Authorware can be published on CD-ROM or networked. Authorware can be used to create computer based training programs, interactive publications, and online multimedia presentations. It is also good for simulating and prototyping applications. Authorware is arguably the most popular development tool for creating multimedia learning applications commonly referred to as CAI (Computer Assisted Instruction). The primary users of this tool are corporate training facilities who need to leverage a small amount of time and money against a large, diverse audience.

The aim of this tutorial is for you to work with an already existing application, drawing its elements from a variety of sources and combining them into a single project.

Among other things, you will be guided on the following:

- (1) Identifying the elements of the Authorware Window
- (2) Creating text and graphics using the toolbox
- (3) Importing graphics into your presentation
- (4) Structuring the interaction between elements of your presentation
- (5) Creating responses
- (6) Designing on-screen menus
- (7) Refining and 'personalizing' your presentation

2.3.1 Characteristic of Authorware

- (1) Object Authoring: use icon instead of scripts. People who are not programmers can create this program easily.
- (2) Media Tool: Authorware programming consists of multimedia tool that can create picture, animation, and sound in order to develop Computer Assisted Instruction.

- (3) Ability-system: Authorware can be used in Macintosh computer or Microsoft Windows and can open program that users don't install Authorware programming.

2.3.2 Components of Authorware

The Authorware interface has five basic component: The icon palette, the menu bar, the design window, and the presentation window.

- (1) Authorware Interface

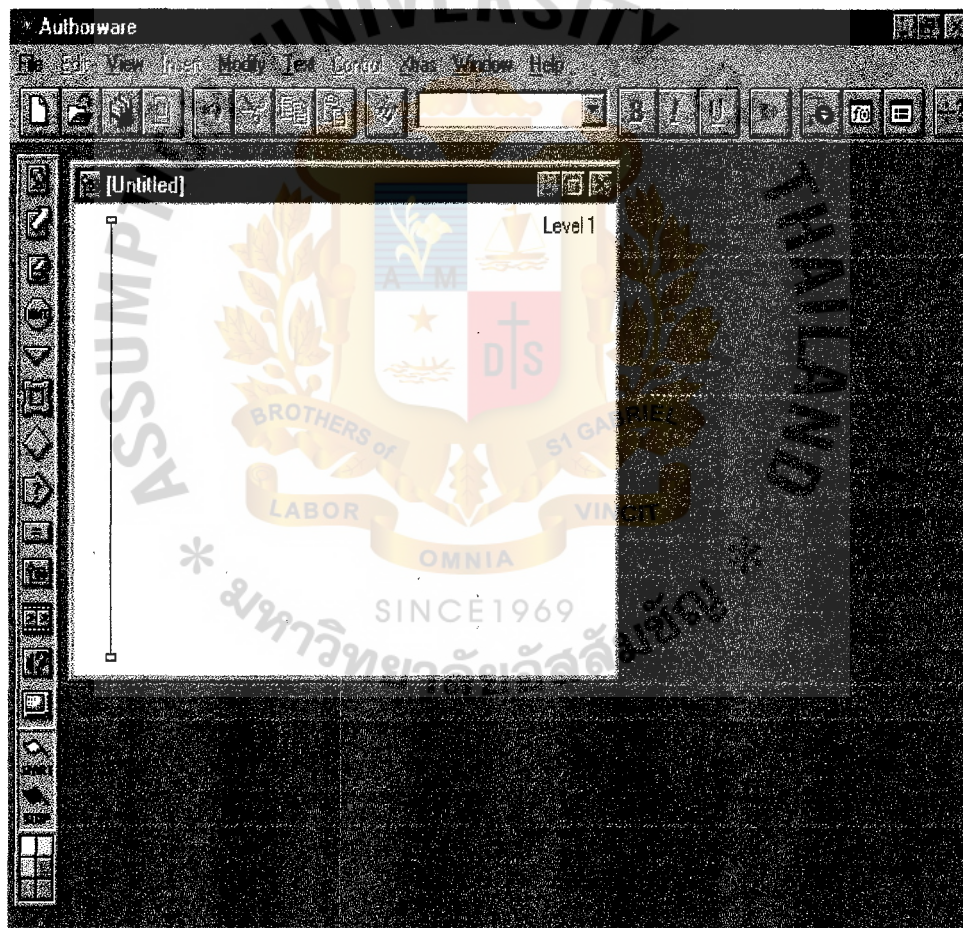


Figure 2.1. Main Interface Components.

(2) Icon Palette



Figure 2.2. Icon Palette.



Figure 2.3. Display Icon.

This is the display icon. It's used to display text and graphics on the screen. You can import images created in any image editor as long as its in a format Authorware understands. Most of the popular formats such as BMP, PSD, GIF, JPG, TIF, and PICT files are supported.



Figure 2.4. Motion Icon.

The motion icon allows you to move the contents of a display, interaction, or movie icon in several different ways. This allows you to do 2D animation, and as we'll see later, sprite animation. If you don't know what that means, we'll cover it in detail later.



Figure 2.5. Erase Icon.

The erase icon is used to erase things you place on the screen with the display icon. Use it only when necessary. As you should know, there are plenty of places where Authorware takes care of erasing for you, such as in an interaction, decision, or framework icon. Overusing erase icons makes your program look sloppy and difficult to follow.



Figure 2.6. Wait Icon.

The wait icon lets you set several kinds of pauses to your program. You can wait for a mouse click, key press (the proverbial 'Any' key), or you can place a simple button on the screen for the user to click. You can also set a specific time limit.



Figure 2.10. Interaction Icon.

The interaction icon is the heart and soul of a multimedia production. Without interaction, Authorware is barely better than Microsoft's PowerPoint. The shape of the interaction icon is significant. It is the combination of the shapes that make up the display icon and the decision icon. It has characteristics of each. You can import and display graphics, text and images in the interaction icon. In fact, you can do everything in the interaction icon that you can in the display icon. You also create your interactivity here. By dragging icons and dropping them to the right of the interaction icon, you can set up buttons, hotspots, text boxes, key presses, and a host of other interactive events to which the user will respond. This is useful in creating tests, surveys, or general program functionality.



Figure 2.11. Calculation Icon.

The calculation icon used to build custom scripting in your piece. This enables us to evaluate expressions, run functions, and keep track of internal variables and custom variables that you create.



Figure 2.12. Map Icon.

The map icon (I sometimes call it the Group icon) lets you group icons together into one neat little package. Macromedia swears there will never be a scroll bar in Authorware so get used to this one. You can group your icons quickly by selecting them and pressing Ctrl-G to group them.



Figure 2.13. Digital Icon.

The digital movie icon allows you to play most popular animation formats including digital video (AVI, MOV, and MPG), animation (FLC, Bitmap Series, PICT Series), and Director movies.



Figure 2.14. Sound Icon.

The sound icon controls the playbacks of digitized sounds such as music, speech, and sound effects recorded and saved using a digital sound-editing tool such as Macromedia sound edit16 plus Deck II (Macintosh).



Figure 2.15. Video Icon.

The video icon controls the playback of frames and sequences of video from external videodisc or videotapes sources. When using the video icon, you can play these sequences on an external monitor or inside Authorware.



Figure 2.16. Motion Icon.

The start and stop flags are used to test segments of your code. You can place the white flag at the beginning of a segment, and the black flag at the end, then only run the code that appears between the two flags. This is a shortcut compared to running a program from the beginning every time you need to test a small section at the end of the program.



Figure 2.17. Icon Color.

The icon color is used to apply colors to selected icons. This helps you organize your flow line by color-coding icons that share similar properties or functions. It helps to keep track of revisions made on a particular file.

(3) The Menu Bar and Toolbar



Figure 2.18. Authorware Menu Bar and Toolbar.

(4) The Design Windows

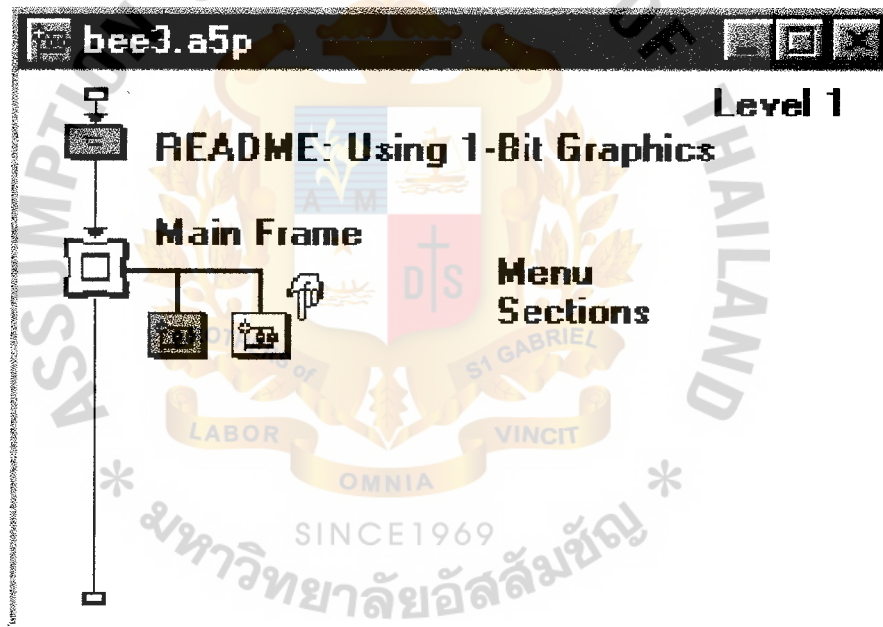


Figure 2.19. Design Windows.

(5) The Presentation Windows

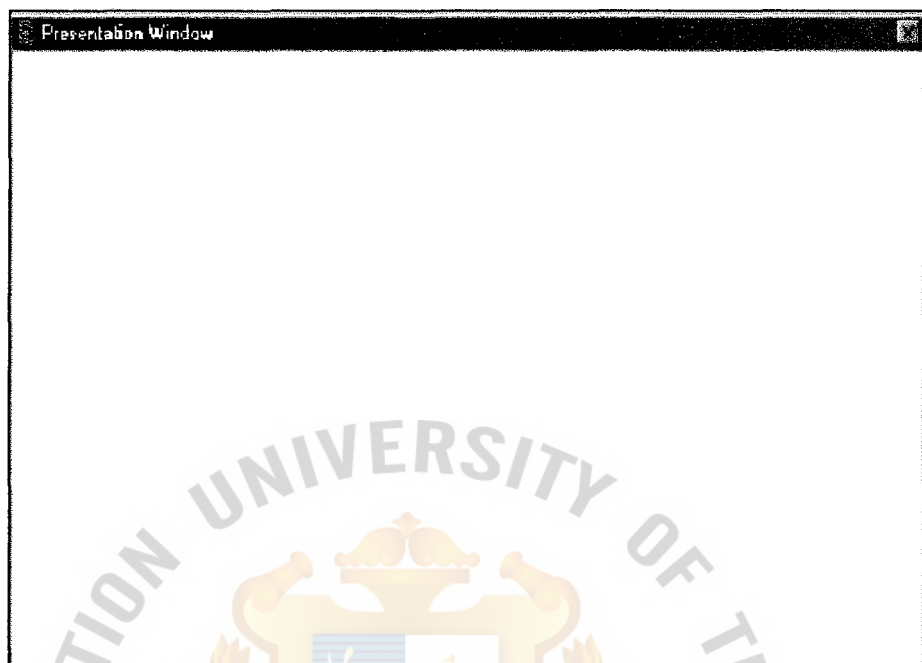


Figure 2.20. Presentation Windows.

III. DESIGN AND DEVELOPMENT SYSTEM

Step to Design and Development System

- (1) Hardware and Software Requirements
- (2) User Requirements
- (3) Define Lesson
- (4) Design Menu
- (5) Package Program

3.1 Hardware and Software Requirements

- (1) Hardware Requirements
 - (a) CPU Intel Pentium 166 MHz up
 - (b) 256 KB cache memory
 - (c) 16 MB Main memory
 - (d) 14 " superVGA color monitor with non-interface and low radiation
 - (e) 3.5 " floppy disk
 - (f) CD-ROM drive
 - (g) 120 Watts Hi-fi Speaker
 - (h) Keyboard 101 keys Thai/English
 - (i) Mouse
 - (j) 3D sound Blaster

- (2) Software requirements
 - (a) Microsoft windows operating system version 95 up
 - (b) Authorware program version 5

3.2 User Requirements

The user requirements are stated followed:

- (1) Computer Assisted Instruction for quality control system appropriated with quality control department every level of department for managers, supervisors, and engineers.
- (2) Users need a system that must be an important quality control activities for basic understanding of quality control.
- (3) Easy to use and understand because the program has interactive windows-like screen, menu-driven, pop-up, and pull-down menu.
- (4) Extensive interactive on-line inquiry is provided.
- (5) Maintenance ability of system to a accommodate future change and requirements.

3.3 Define Lesson

The detail of Computer Assisted Instruction of quality control system consists of 3 topics:

- (1) Fundamental of Quality Control
- (2) Quality Control Techniques
- (3) Statistic Quality Control

This is a descriptive of lesson of Computer Assisted Instruction for Quality Control system.

Introduction

Quality Control is important to lead the organization to a success and company grows in both national and international markets. The return on investment from strong and effective quality programs is providing excellent profitability results in firms with effective quality strategies. Quality Control provides structure and tools for managing quality throughout the organization on quality leadership genuine investment and implementation and modern technology for every level in organization.

(1) Fundamental of Quality Control

Definition

Quality Control is an effective system for integrating the quality development, quality maintenance, and quality improvement. Quality control involves the managerial and technical implementation of customer-oriented, quality activities in organization.

Quality Control is the use of techniques and activities to achieve, sustain, and improve the quality of product or service related with:

- (a) Specifications of what is needed.
- (b) Design of the product or service to meet the specifications.
- (c) Production or installation to meet the full intent of the specifications.
- (d) Inspection to determine conformance to specifications.
- (e) Review of usage to provide information for the revision of specifications if need.

Principles of Quality Control

- (a) QC is everyone's responsibility.

Each person in the organization is expected to perform quality control functions. Managers should take job enlargement that is an approach of one employee inspecting another's work places greater job responsibility in order to increase productivity, learning other job, and improve employee's morale.

- (b) Ensure that everyone sees QC measures and statistics.

Everybody in the plant that generates a product is responsible for the product quality also knows how good or bad the organization's product quality. The use of QC measures can, for some firms, quickly reinforce quality assurance efforts.

- (c) Ensure quality compliance.

Like establishing reward systems such as bonus or pay increase based on product quality improvement and reprimands for poor quality performance. All operations managers must be motivated to think quality first and production second.

- (d) Those who generate it should improve poor quality.

The worker who creates a defect in a product or the engineer who incorrectly designs a component part should be the one to improve it. The worker will learn to do right. Other workers will also be motivated not to make mistakes because of the embarrassing consequences of correcting their own errors.

- (e) Conduct 100 percent elemental inspections

The materials and components are called product elements; each element is inspected before the next is incorporated into the product. If one component is irregular, it might keep the next component from

being properly incorporated into the product. In Japanese manufacturers there is highest product quality rating in the world because every element inspection actually builds quality into the product during the transformation process.

Responsibility for Quality Control

- (a) Marketing responses to evaluate the level of the product quality that the customer needs and provide customer with product quality data and helps to determine quality requirements.
- (b) Product engineering responses to translate the customer's quality requirements into operating characteristics, exact specifications and appropriate tolerances for new product.
- (c) Purchasing responses to procuring quality materials and components.
- (d) Manufacturing engineering responses to develop process and procedure that will produce a quality product achieved by specific activities including process selection and development, production planning and support activities.
- (e) Manufacturing responses to produce quality products Supervisor's responsibility to provide the employee with the proper tools for the job and to provide instructions on method of the job and quality expectations of the job.
- (f) Inspection and test: responses to appraise the quality of purchase and manufacture items and to report the results.
- (g) Packaging and shipping: responses to preserve and protect the quality of product related with distribution, installation and use of product.

- (h) Product service: responses to provide the customer with the means for fully realizing the intended function of product during expected life include sales and distribution, installation, technical assistance, maintenance and disposal after use.

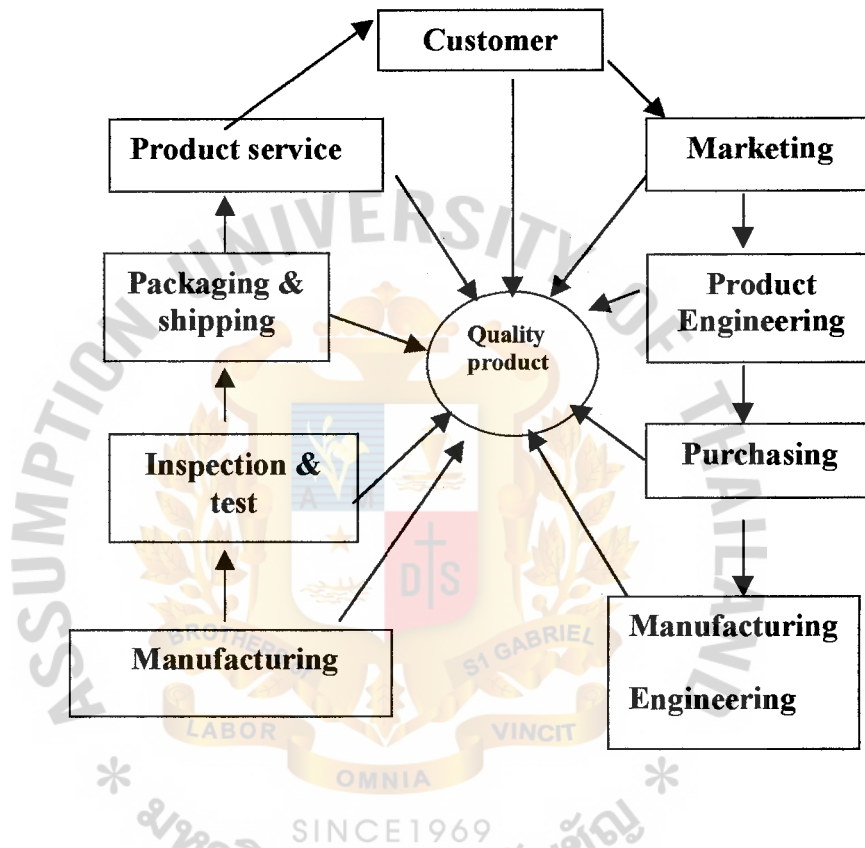


Figure 3.1. Responsibility of Quality Control.

(2) Quality Control Techniques

Seven QC Tools

- (a) Pareto analysis is a diagram for tallying the percentage of defects resulting from different causes to identify major quality problems. It is a method of identifying the causes of poor quality. Tallying the number of defects for each of the different possible causes of poor quality in a product or service.

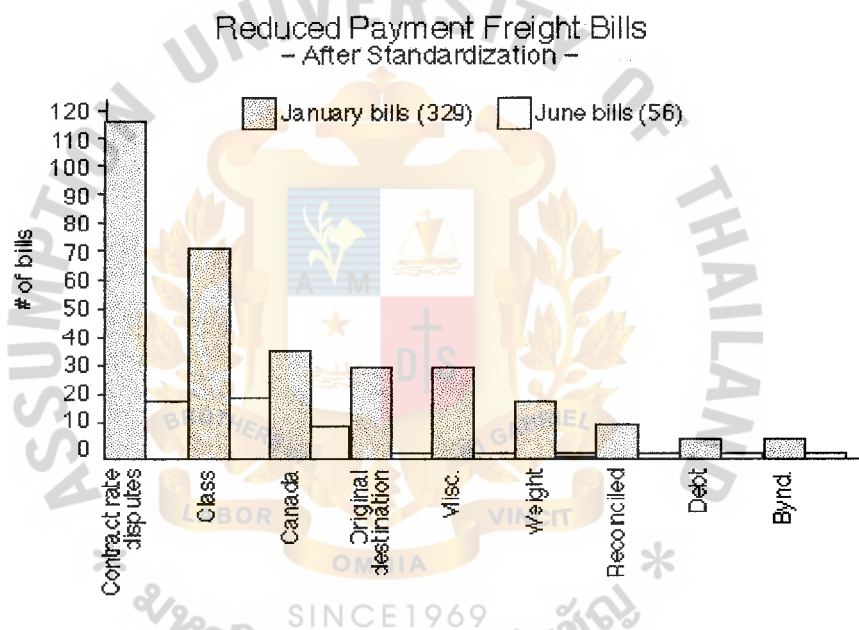


Figure 3.2. Pareto Diagram.

- (b) Flowchart or process chart is a diagram of the steps in a job, operation, or process. It helps to focus on where problems might occur and identify problems by helping the problem solvers better understand the process.

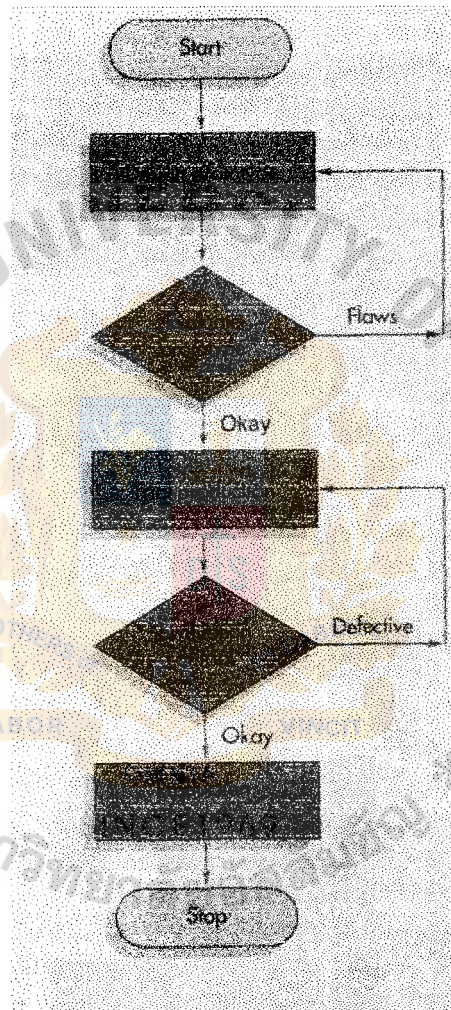


Figure 3.3. Flowchart.

- (d) Histogram is a diagram showing the frequency of data related to quality problem. Histogram can be used to develop bar chart. Histograms provide a simple, graphical view of accumulated data, including its dispersion and central tendency. In addition to the ease with which they can be constructed, histograms provide the easiest way to evaluate the distribution of data.

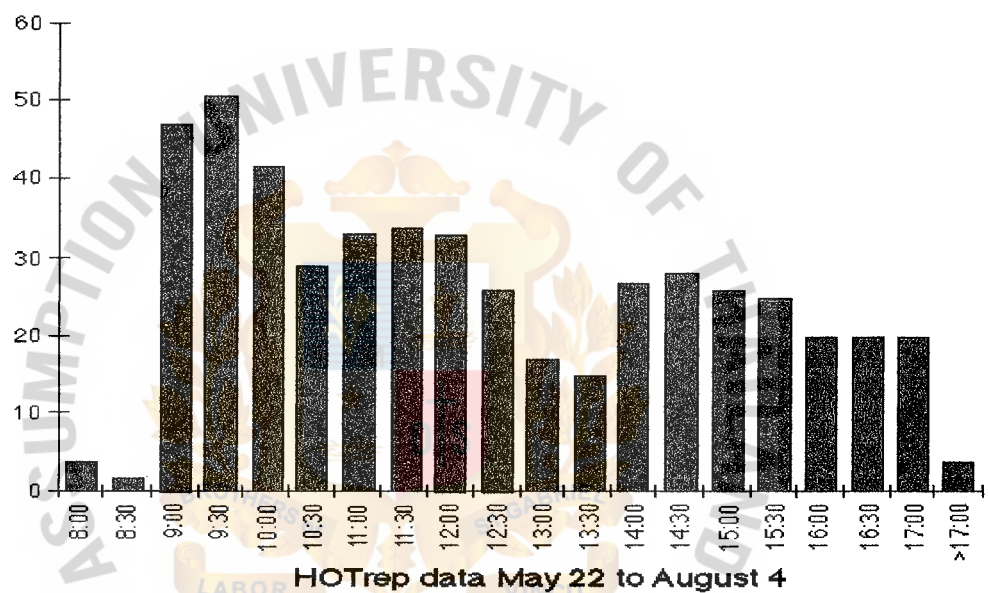


Figure 3.5. Histogram.

- (e) Scatter Diagrams graphically show the relationship between two variables, such as the brittleness of a piece of material and the temperature at which it is baked. One temperature reading should result in a specific degree of brittleness representing one point on the diagram. Many such appoints on the diagram visually show a pattern between the two variables and a relationship.

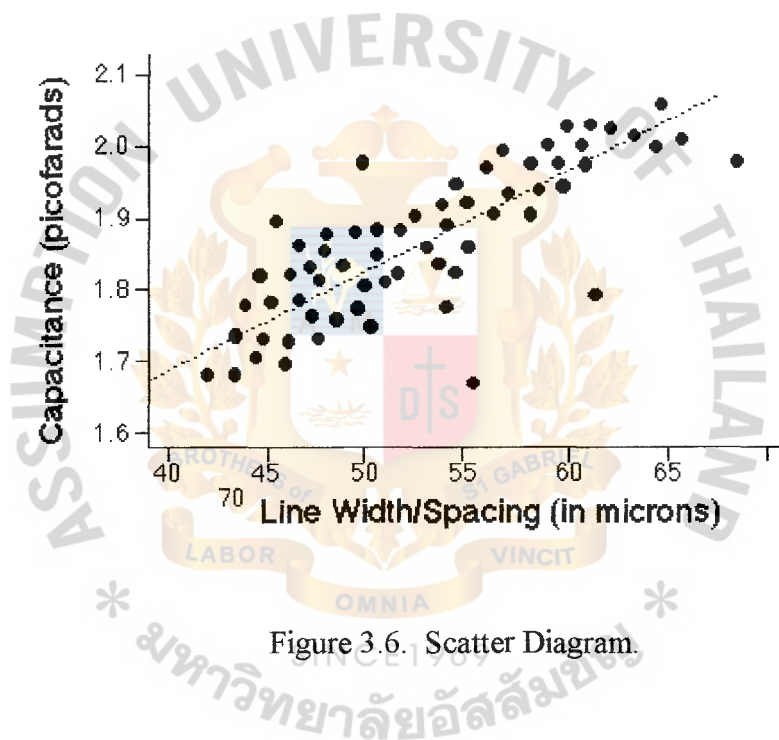


Figure 3.6. Scatter Diagram.

- (f) Statistical Process Control Chart is a chart with statistical upper and lower limits; if the process stays between these limits over time it is in control and problem does not exist.

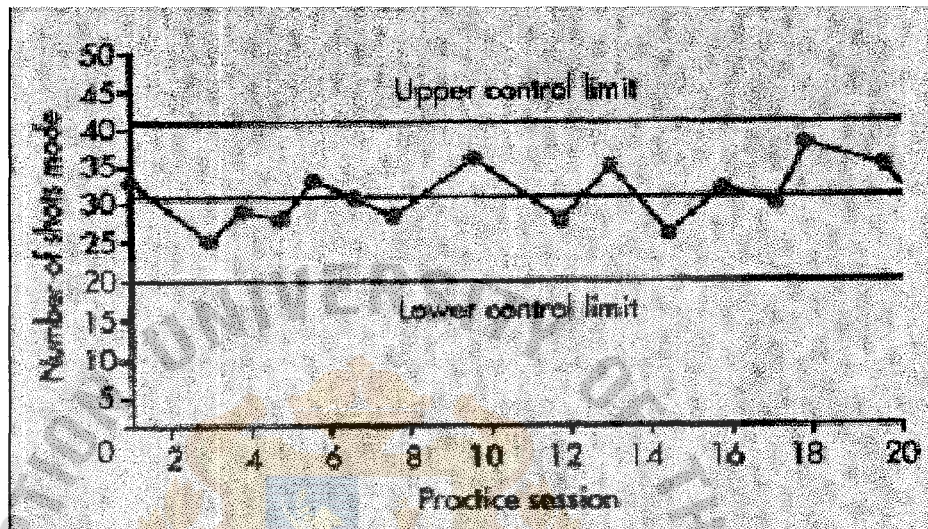


Figure 3.7. Statistical Process Control Chart.

- (g) Cause and Effect Diagrams, also called a fishbone diagram, is a graphical description of the elements of a specific quality problem and the relationship between those elements. It is used to identify the causes of a quality problem and to develop problem solving system to help the team of employees, supervisors, and managers identify causes of quality problems.

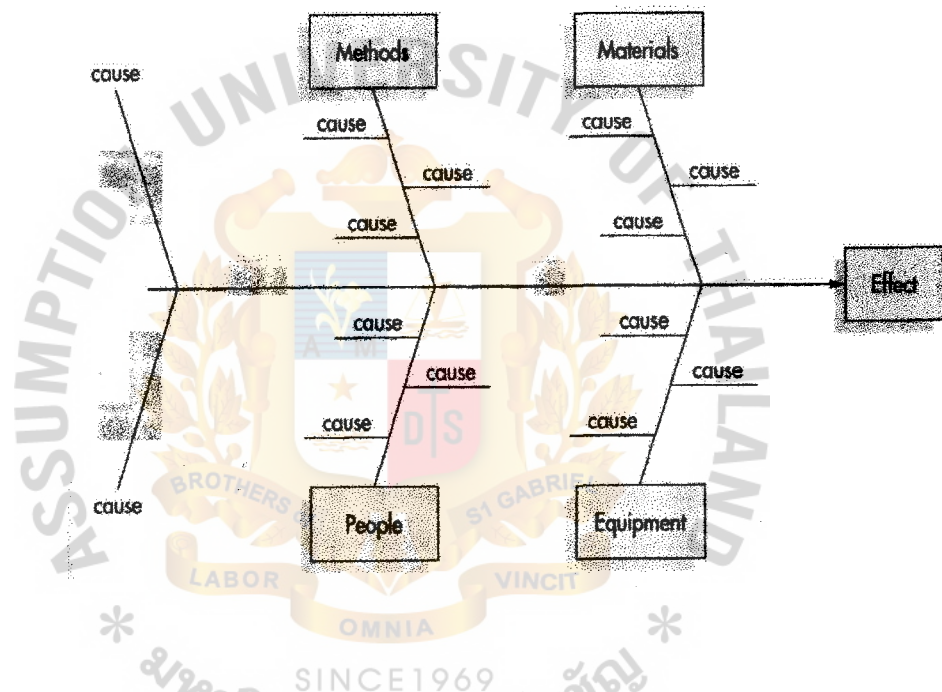


Figure 3.8. Cause-Effect Diagram.

Quality Control Tactics

(a) Cut lot sizes

In Quality control, we want product quality problems in lot-related production processes or products in a lot to be revealed quickly to save reworking. Quality problems in larger lots, on the other hand, will not be as quickly noticed because their sizes give them a place to hide.

(b) Cut safety and buffer stock quantities

Without the extra buffer and safety stock, product quality problems will more easily surface because they have no place to hide. The sources of nonconformity that can be identified include both vendors and the organizations own employees who make process-manufacturing errors. The firm should improve future product quality and save considerable rework costs.

(c) Revise the QC department's role from inspector to educator

The inspector who concerns QC departments should change role to be educated and keep employees informed of the new approaches to quality management and to keep the organization moving toward the QC goal of zero defects. QC personnel can also be used to help employees understand how quality is monitored and how to interpret SQC charts.

(d) Establish a daily maintenance plan for each employee

The role of maintenance in quality control is important, the machine maintenance, inspection tools, and keeping workstation

clean should be daily habit for each employee. This work can usually be performed during downtimes when quality problems are being corrected so the organization does not lose production time.

Quality Control Improvement

- (a) ISO 9000 is one way that organizations can be guided into internationally accepted standard of total quality control. ISO9000 is a series of published quality standards and terminology.

ISO 9000: Quality management and quality assurance standards for selection and use.

ISO 9001: Quality system-model for quality assurance in design /development, production, installation, and servicing.

ISO 9002: Quality system-model for quality assurance in Production and installation.

ISO 9003: Quality system-model for quality assurance in final inspection and test

ISO 9004: Quality management and quality system elements guide lined.

- (b) Quality Circles is a small group of workers who are assembled to study ways to solve problems or helps plan new production activities. Some the basic idea for quality circles came from informal groups of workers meeting to discuss problem after working hours. Step of Quality Circle programs;

- (1) Identified problem that could be solved by quality circle.
 - (2) Quality circles come from several levels of organization; a few workers, one or two supervisors from problem area, and one from technical specialists.
 - (3) Quality circle is assigned a formal agenda usually team leader, and meeting dates (daily, weekly, or monthly).
 - (4) Members have free idea to comment or identify problem. Workers and supervisors are equal members in the group and can offer suggestion that helps deal problem under study.
 - (5) Once problem alternatives are developed. They are offered to manage for solution choice and approval.
- (c) Zero Defects is changing employee's attitudes to be manage about cutting cost and gaining better production quality. Purpose of zero defects is eliminating defects. Defects or worker error are usually caused by one or more combination of employees not knowing how to perform operations, not having facilities to perform operations correctly, and not paying enough attention to perform operations correctly.
- (d) Employee Suggestions is a simple suggestion that is strong commitment and reinforcement from management at all levels. Operators must be sufficiently trained to identify quality problem so that they can make goods suggestions. Employee suggestions can help employees feel involved in management.

(3) Statistical Quality Control

SQC stands for Statistical Quality Control and is used to identify process variations. SQC is typically illustrated in a format known as a Control Chart. The use of Control Charts (with control limits or specifications) on actual processes permits differentiation between random

fluctuations of data and true process shifts. Control Charts are, therefore, simply a graphical way of evaluating whether or not a process is in a "state of statistical control."

In many companies, SQC has been applied with large economic benefits. However, SQC's actual implementation has often been limited because of data availability and the time and effort required performing the extensive calculations and graphing required with large data sets.

Statistical Process Control (SPC)

A purpose of quality control is to detect problems and to take corrective action. Statistical Process Control is concerned with monitoring standards, making measurements, and taking corrective action as a product or service is being produced. Periodic samples of process output are examined, and if they are within acceptable limits, the process is permitted to continue. If they fall outside of certain specified ranges, the process is stopped and adjusted. Statistics can be defined as the art and science of making inferences or conclusions from data.

Control Chart

The purpose of control charts is to help distinguish between natural variations and assignable causes such as machine wear, fatigue, untrained workers, etc. The

tool used to actually implement statistical process control is called a control chart. Quality engineers can plug the data into simple formulas which will tell us, based on what we have already done, what we are capable of doing. Control limits describe the probability of a process being "out of control." The top one is the upper control limit (UCL) and the bottom one is the lower control limit (LCL). If our averages ever fall outside of those lines, our process centering has moved beyond normal variations.

Types of Control Charts

(1) P chart

P Chart uses the proportion defective in a sample that taken periodically from the production process and the proportion of defective items in the sample is determined to see if proportion falls into control limits.

$$UCL = p + z\sigma_p$$

$$LCL = p - z\sigma_p$$

Z = Number of standard deviation from process average

P = The population proportion defective or the process average

σ_p = the standard deviation of sample proportion $\sigma_p = \sqrt{p(1-p)}$

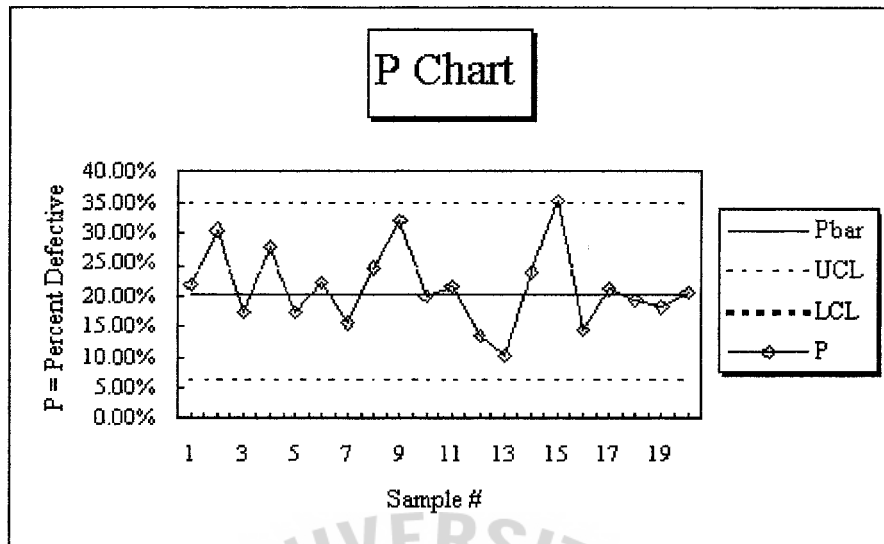


Figure 3.9. P –Chart.

(2) C chart

C Chart is used when it is not possible to compute a proportion defective, and actual number of defects must be used instead.

$$UCL = C + z\sigma_c$$

$$LCL = C - z\sigma_c$$

Z = Number of standard deviation from process average

C = the mean number of defects per sample or process average

σ_c = the standard deviation of sample, $\sigma_c = \sqrt{C}$

Example for Making C Control Chart

Surface defects have been counted on 25 rectangular steel plates, and the data are shown below. The control chart for nonconformities is set up using this data.

Table 3.2. Example C Chart.

Plate No.	No. of Nonconformities	Plate No.	No. of Nonconformities
1	1	14	0
2	0	15	2
3	4	16	1
4	3	17	3
5	1	18	5
6	2	19	4
7	5	20	6
8	0	21	3
9	2	22	1
10	1	23	0
11	1	24	2
12	0	25	4
13	8	Mean	2.36

The Upper Control Limit (UCL) and the Lower Control Limit (LCL) are calculated as follows:

$$UCL = C + z\sigma_c = 6.968$$

$$LCL = C - z\sigma_c = 0$$

The c chart is drawn with the Plate number on the x axis and the number of conformities on the y axis. The lines showing the Upper Control Limit, the Lower Control Limit and the mean are also drawn. The figure below shows the control chart.

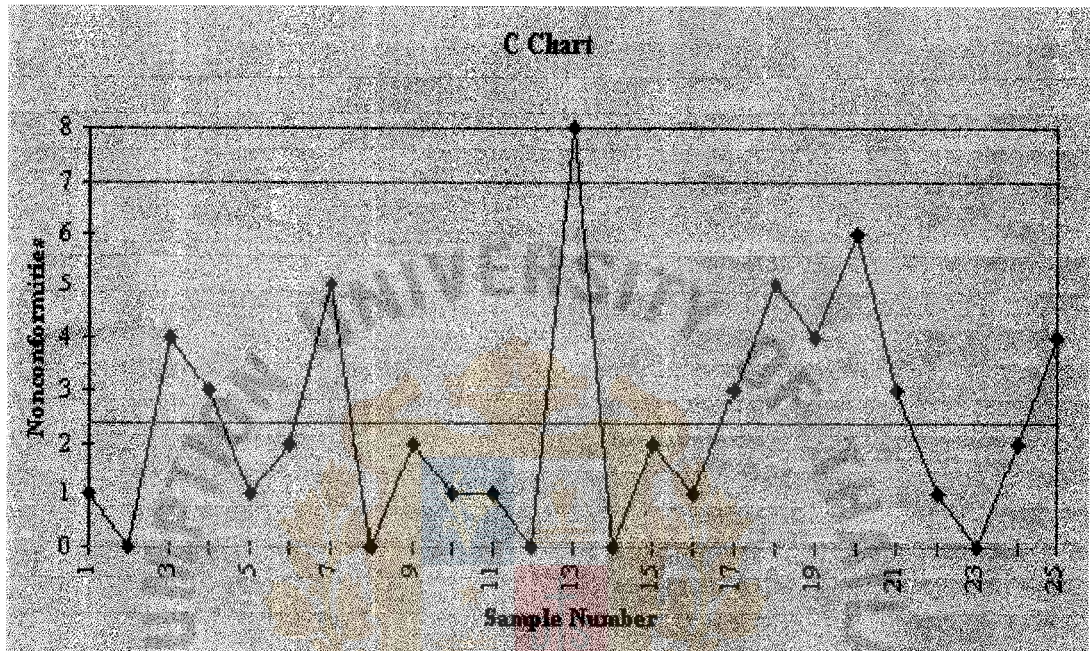


Figure 3.10. C-chart.

(3) R chart

R chart is developed from the ranges of each subgroups data, which is calculated by subtracting the maximum and the minimum value in each subgroup.

Example for Making R Chart

Plastic Keychains are being produced in a company named Etcetra. The plastic material is first molded and then trimmed to the required shape. The curetimes during the molding process affect the edge quality of the Keychains produced.

Table 3.3. Example of R Chart.

Sample No.	Observations				Means	Range
1	27.34667	27.50085	29.94412	28.21249	28.25103	2.59745
2	27.79695	26.15006	31.21295	31.33272	29.12317	5.18266
3	33.53255	29.32971	29.70460	31.05300	30.90497	4.20284
4	37.98409	32.26942	31.91741	29.44279	32.90343	8.54130
5	33.82722	30.32543	28.38117	33.70124	31.55877	5.44605
6	29.68356	29.56677	27.23077	34.00417	30.12132	6.77340
7	32.62640	26.32030	32.07892	36.17198	31.79940	9.85168
8	30.29575	30.52868	24.43315	26.85241	28.02750	6.09553
9	28.43856	30.48251	32.43083	30.76162	30.52838	3.99227
10	28.27790	33.94916	30.47406	28.87447	30.39390	5.67126

Table 3.3. Example of R Chart. (Continued)

Sample						
No.	Observations				Means	Range
11	26.91885	27.66133	31.46936	29.66928	28.92971	4.55051
12	28.46547	28.29937	28.99441	31.14511	29.22609	2.84574
13	32.42677	26.10410	29.47718	37.20079	31.30221	11.09669
14	28.84273	30.51801	32.23614	30.47104	30.51698	3.39341
15	30.75136	32.99922	28.08452	26.19981	29.50873	6.79941
16	31.25754	24.29473	35.46477	28.41126	29.85708	11.17004
17	31.24921	28.57954	35.00865	31.23591	31.51833	6.42911
18	31.41554	35.80049	33.60909	27.82131	32.16161	7.97918
19	32.20230	32.02005	32.71018	29.37620	31.57718	3.33398
20	26.91603	29.77775	33.92696	33.78366	31.10110	7.01093
21	35.05322	32.93284	31.51641	27.73615	31.80966	7.31707
22	32.12483	29.32853	30.99709	31.39641	30.96172	2.79630
23	30.09172	32.43938	27.84725	30.70726	30.27140	4.59213
24	30.04835	27.23709	22.01801	28.69624	26.99992	8.03034
25	29.30273	30.83735	30.82735	31.90733	30.71869	2.60460

Means 30.40289 Rmean 5.932155

Using $n = 4$, We get that $D3 = 0$ and $D4 = 2.282$.

$LCL = Rmean \times D3 = 0$

$UCL = Rmean \times D4 = 13.525$

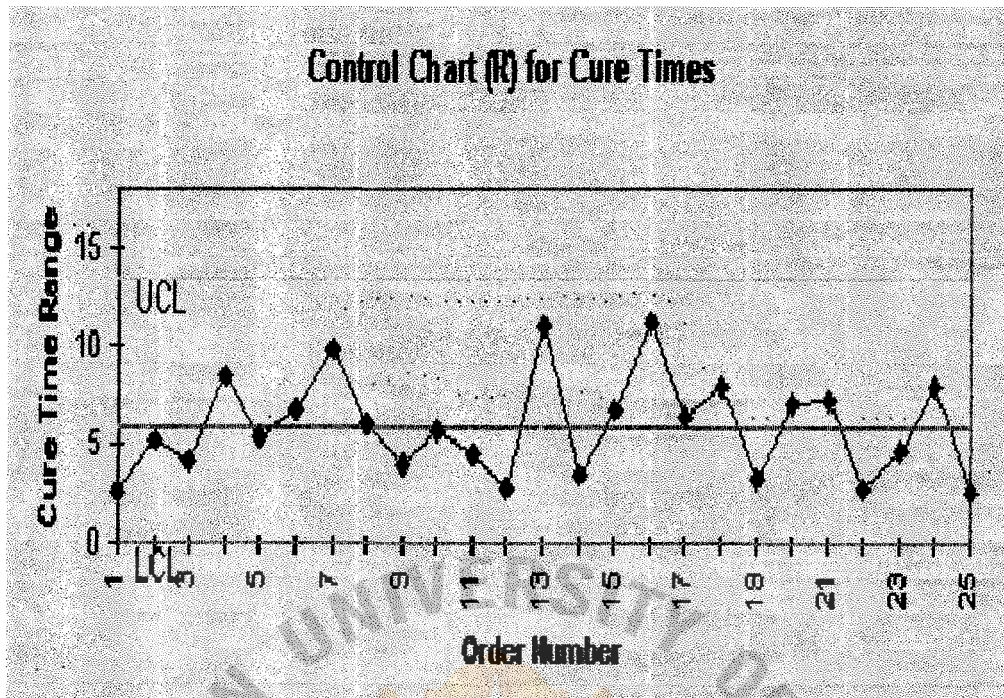


Figure 3.11. R Chart.

The R chart is drawn with the 25 sample ranges plotted on the chart. The Control limits and the centerline are also drawn. All the points are within the control limits and no particular pattern can be observed. Therefore the process variability is in control.

3.4 Design Menu

- (1) Main Menu is the main of program, you can select tittle, introduction, and menu for enter the windows.

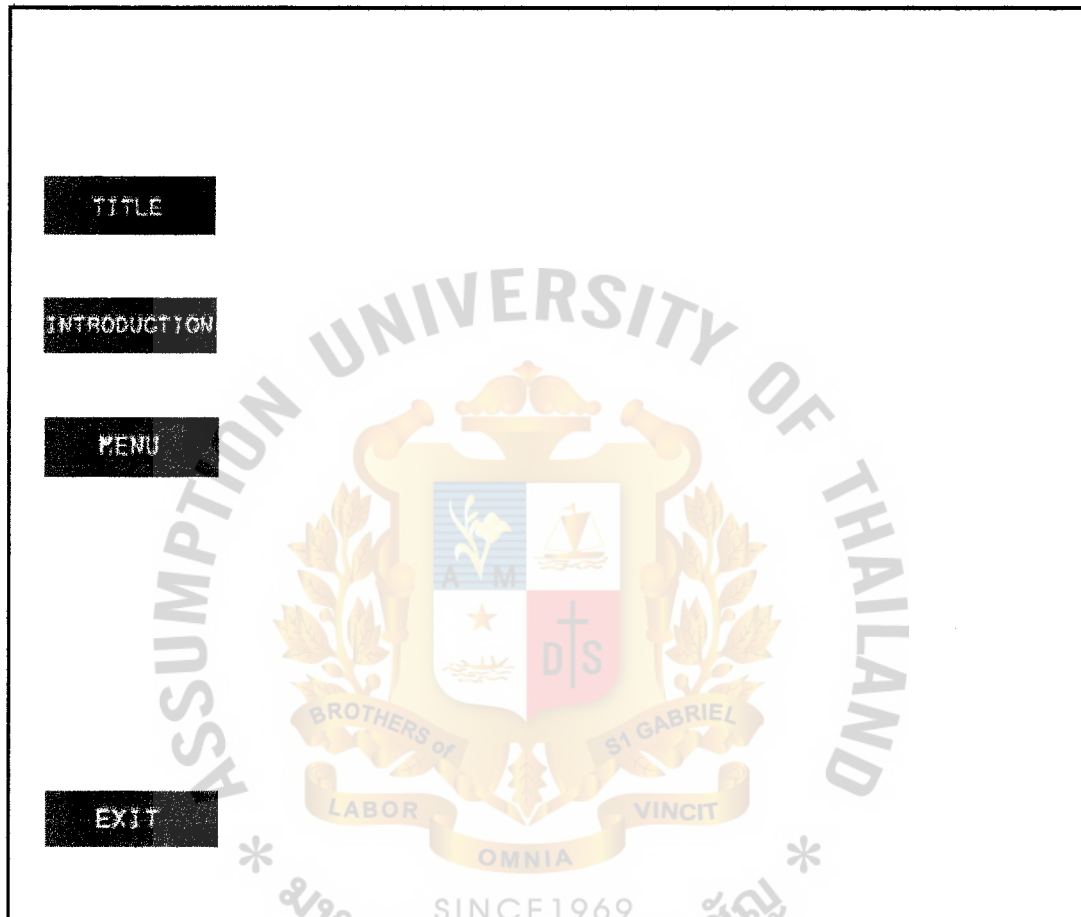


Figure 3.12. Main Menu.

- (2) Menu Content is the menu that performs contents of this program. It is consists of 3 contents: Fundamental of Quality Control, Quality Control Techniques, and Statistical Quality Control. You can select other parts of windows such as title, Introduction, or back to main menu.

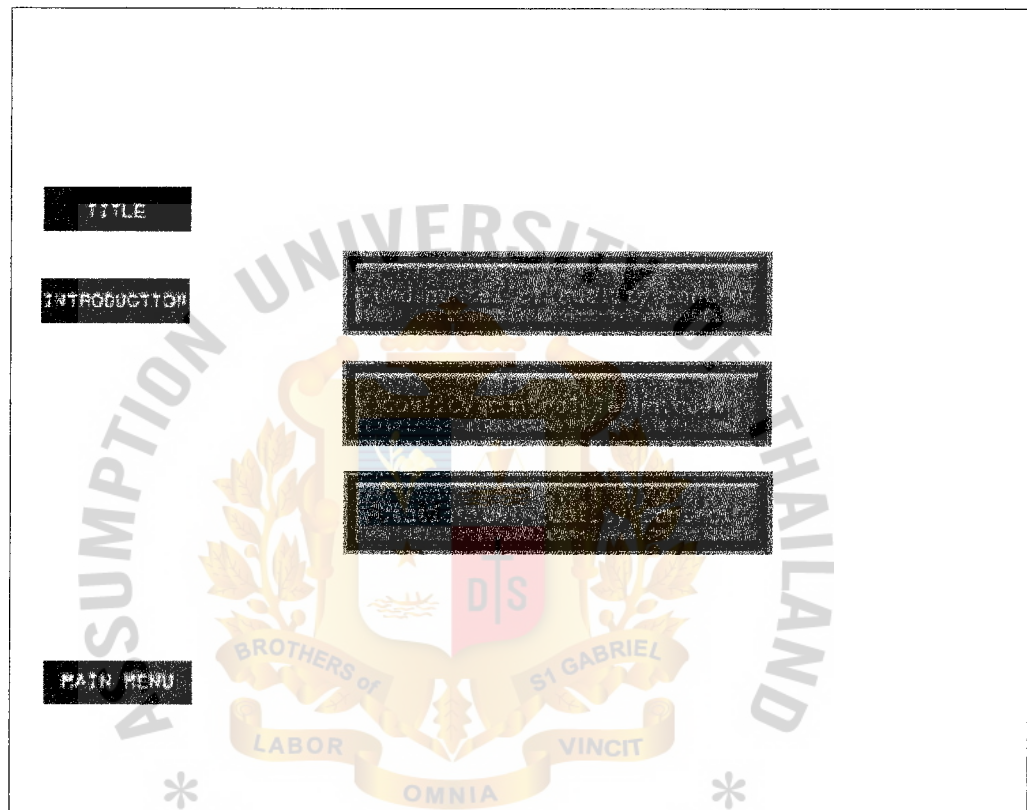


Figure 3.13. Menu.

- (3) Lesson Menu is the menu to control entering lessons that you want to select also selects other parts of main menu.

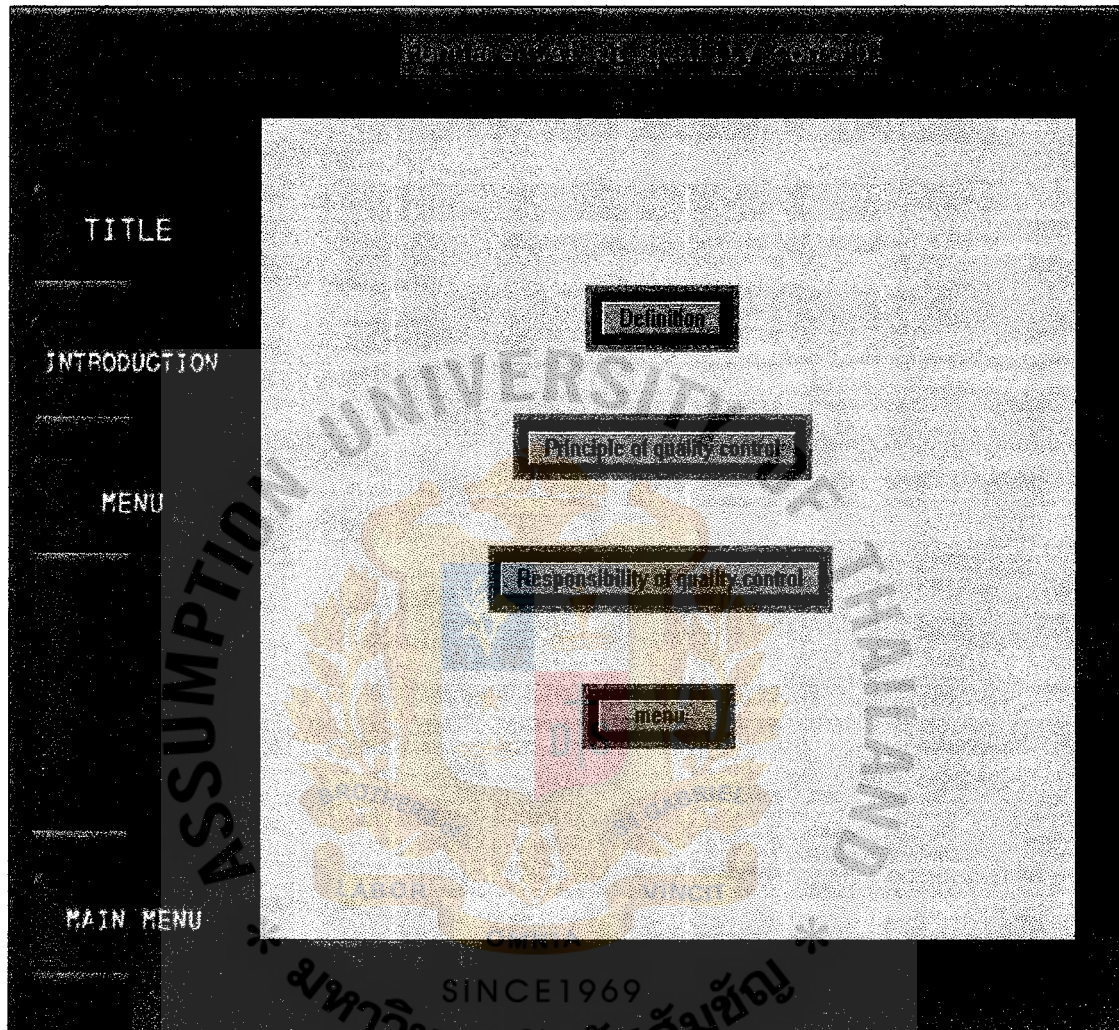


Figure 3.14. Lesson Menu.

3.5 Package Program

This program packages in CD-ROM in order to make it convenient to use that Auto-run program. It can be open with or without Authorware. The memory of CD-ROM about 40 MB consists of text, sounds, file video, and graphics.



IV. TEST AND EVALUATE PROGRAM

4.1 Testing

4.1.1 Identify Users

Users in TCP ThaiCast Manufacturing Company in quality control department such as manager, quality control supervisor, and engineers.

4.1.2 Selecting Users

From step 1 from quality control department to test Computer Assisted Instruction for quality control. It takes about 8 people .All users should have time to test program because it uses time for a training program.

4.1.3 Tool for Testing

Computer hardware requirements

- (1) CPU Intel Pentium 166 MHz up
- (2) 256 KB cache memory
- (3) 16 MB Main memory
- (4) 14" super VGA color monitor with non-interface and low radiation
- (5) 3.5 " floppy disk
- (6) CD-ROM drive
- (7) 120 Watts Hi-fi Speaker
- (8) Keyboard 101 keys Thai/English
- (9) Mouse
- (10) 3D sound Blaster

Questionnaire

Using questionnaire performed attitude of users after learning a Computer Assisted Instruction for Quality Control System. It can be proved and analyzed successful of the program.

The questionnaire was designed to evaluate users knowledge and analyze user's attitude of Computer-Assisted Instruction for quality control of quality control.

4.1.4 Install Program

- (1) Check specification of microcomputer and should have space of hard disk about 40 MB.
- (2) Open the program from CD-ROM in the project report. It's automatically program on Microsoft Windows 98 up.

4.2 Program Evaluation

4.2.1 Evaluation Methodology

The program is evaluated by using the questionnaires that involved with attitudes of employees about Computer Assisted Instruction for quality control system. The questionnaires are analyzed by SPSS program. The researcher collected the questionnaires from a casestudy factory in Quality Control Department of TCP ThaiCast Manufacturing Company. The total samples of these questionnaires are 8.

4.2.2 Questionnaire Design

The questionnaire was designed to evaluate employee's attitude and analyzed in Computer Assisted Instruction for quality control system. Thus the questionnaire described below:

Part 1 Checklist formats. It is related to the status of respondents consisting of gender, age, education, education major, position, and experience.

Part 2 Rating Scale formats. It is related to attitude and opinion of employees after using Computer Assisted Instruction for Quality Control, which are arranged in 5 levels as the following:

- 5 Strongly Agree
- 4 Agree
- 3 Neither agree nor disagree
- 2 Disagree
- 1 Strongly Disagree

4.2.3 Analyzed Data



Part 1 Personnel Data

Table 4.1. Total Number of Respondents Based on Gender.

Status	Frequency	Percentage (%)
Gender		
Male	7	87.5
Female	1	12.50
Total	8	100

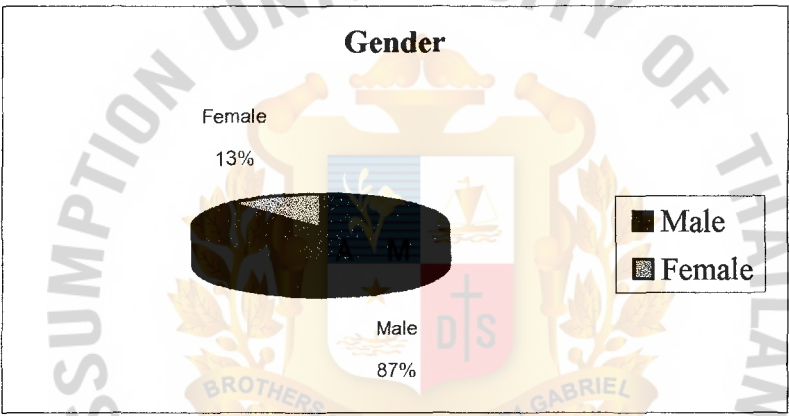


Figure 4.1. Total Number of Respondents Based on Gender.

There are totally 8 respondents, 12.5% is female and 87.5% is male.

Table 4.2. Total Number of Respondents Based on Age.

Status	Frequency	Percentage (%)
Age		
21-25	3	37.5
26-30	2	25
31-35	2	25
36-40	1	12.5
Above 40	0	-
Total	8	100

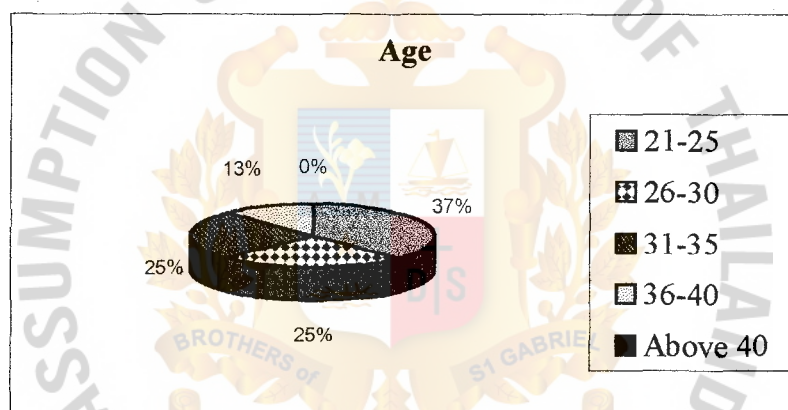


Figure 4.2. Total Number of Respondents Based on Age.

Total Number of Respondents based on age is as follows: 22-25 years is 37.5%, 26-30 years is 25%, 31-35 years is 25%, 36-40 years is 12.5% and above 41 is 0%. The highest group of respondents based on age is 22-25 years that shows 37.5%.

Table 4.4. Total Number of Respondents Based on Education Major.

Status	Frequency	Percentage
Education Major		
Science	2	25
Engineer	4	50
Business	2	25
Other	0	-
Total	8	100

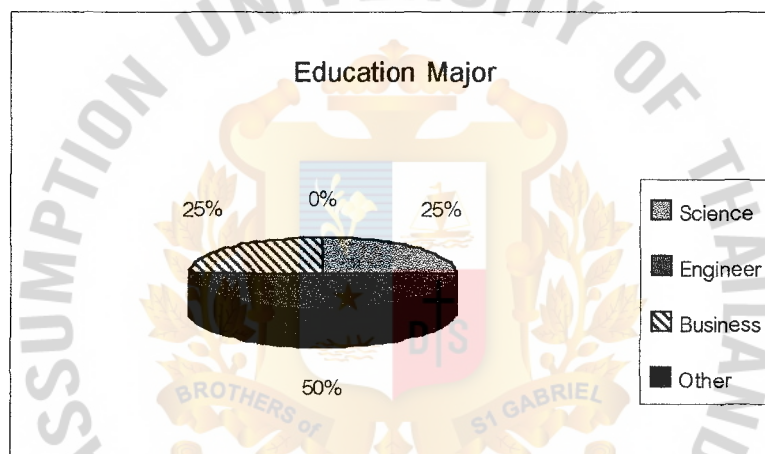


Figure 4.4. Total Number of Respondents Based on Education Major.

Total Number of respondents based on Education Major: Science 25%, engineer 50%, Business 25%, and other 0%. The highest group of respondents based on Education Major is engineer (50%).

Table 4.5. Total Number of Respondents Based on Position.

Status	Frequency	Percentage(%)
Position		
Manager	1	12.5
Supervisor	4	50
Engineer	3	37.5
Total	8	100

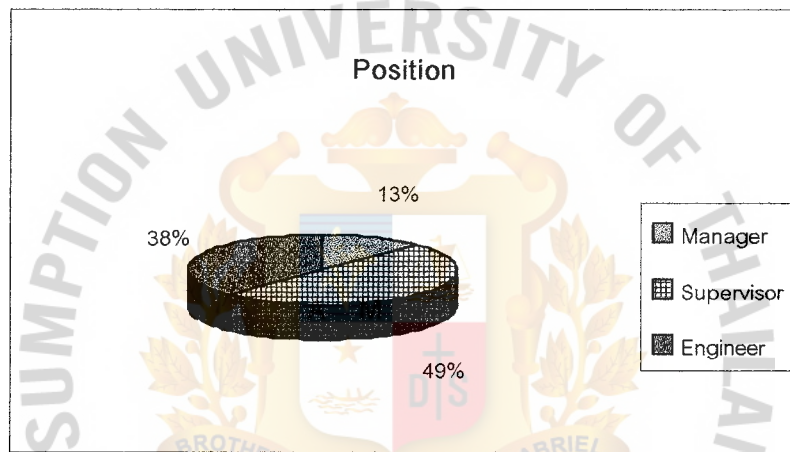


Figure 4.5. Total Number of Respondents Based on Position.

Total Number of respondents based on Position Manager 12.5%, Supervisor 50%, and engineer 37.5%. The highest group of respondents based on Position is Supervisor (50%).

Table 4.6. Total Number of Respondents Based on Experience.

Status	Frequency	Percentage(%)
Experience		
Lessthan 1 years	1	12.5
1-3 years	4	50
3-5 years	2	25
Morethan 5 years	1	12
Total	8	100

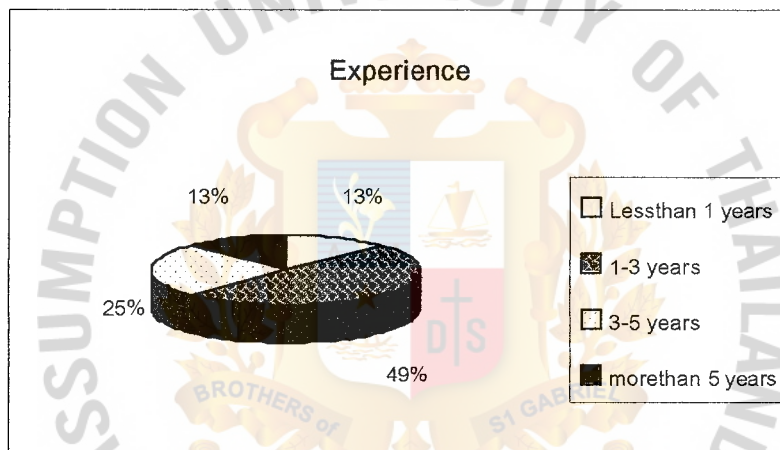


Figure 4.6. Total Number of Respondents Based on Experience.

Total Number of respondents based on Experience: Less than 1 year 12.5%, 1-3 years 50%, 3-5 years 25%, and morethan 5 years 12.5%. The highest group of respondents based on Experience is 1-3 years 50%.

Part II Employee's attitude in computer Assisted Instruction for quality control system

(1) Help you to understand quality control

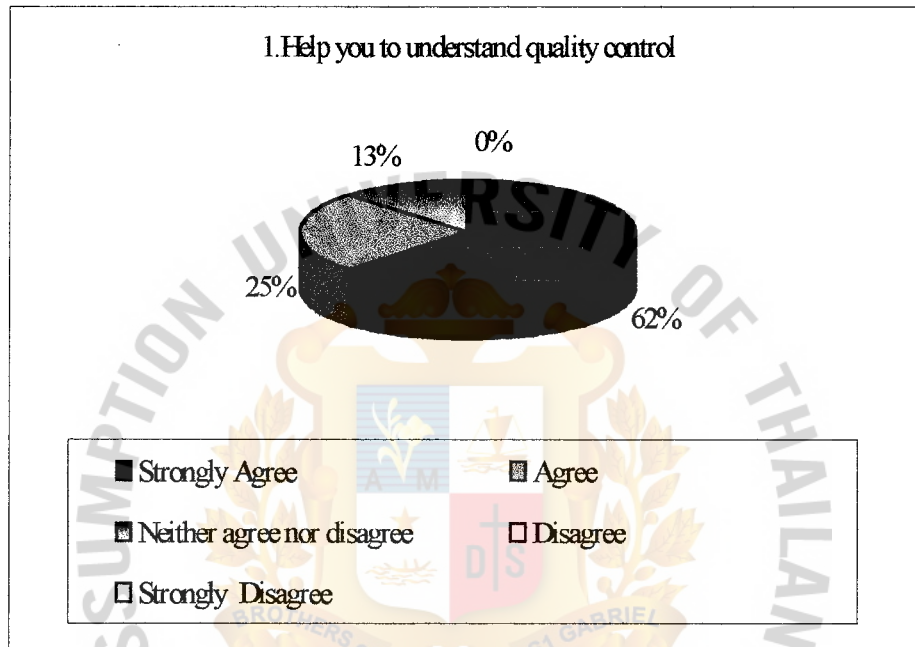


Figure 4.7. Help You to Understand Quality Control.

From the total number of user's attitude to help understand quality control shows that strongly agree 62%, agree 25% and neither agree nor disagree 13%. From the percentage 62% shows that users have better understanding both concepts and tools of quality control more than existing knowledge.

(2) Help you to active in lesson

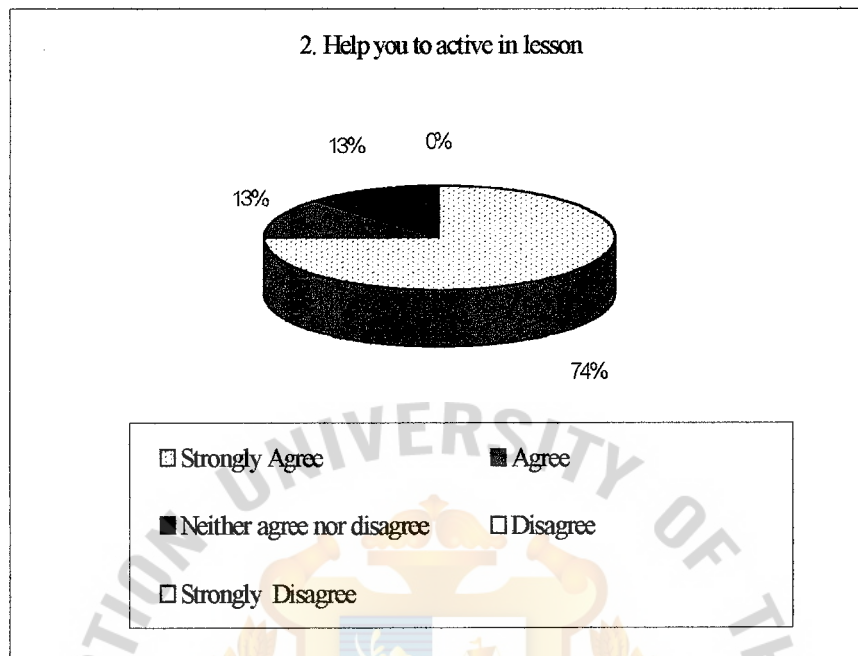


Figure 4.8. Help You to Active in Lesson.

From the total number of user's attitude to active in lesson shows that strongly agree 74%, agree 13% and neither agree nor disagree 13%. From the percentage 74%, users have active in lesson because training with computer is easy to understand and convenient in training.

(3) Help you to interest more

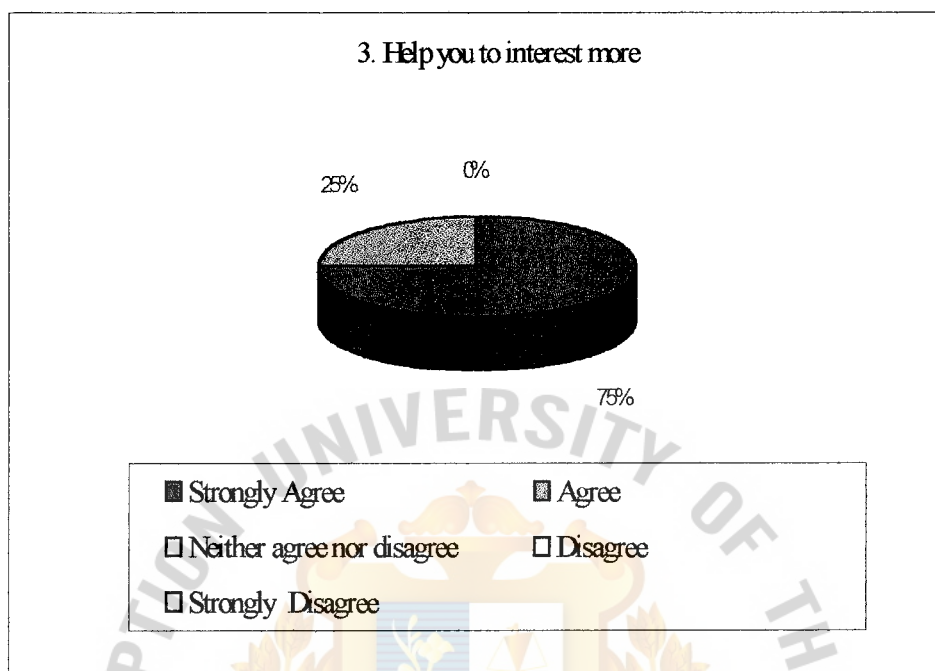


Figure 4.9. Help You to Interest More.

From the total number of user's attitude to help you to interest more shows that strongly agree 75%, agree 25%. From the percentage shows that the program interests because it has some pictures and sounds in the lesson.

(4) Training by computer is necessary

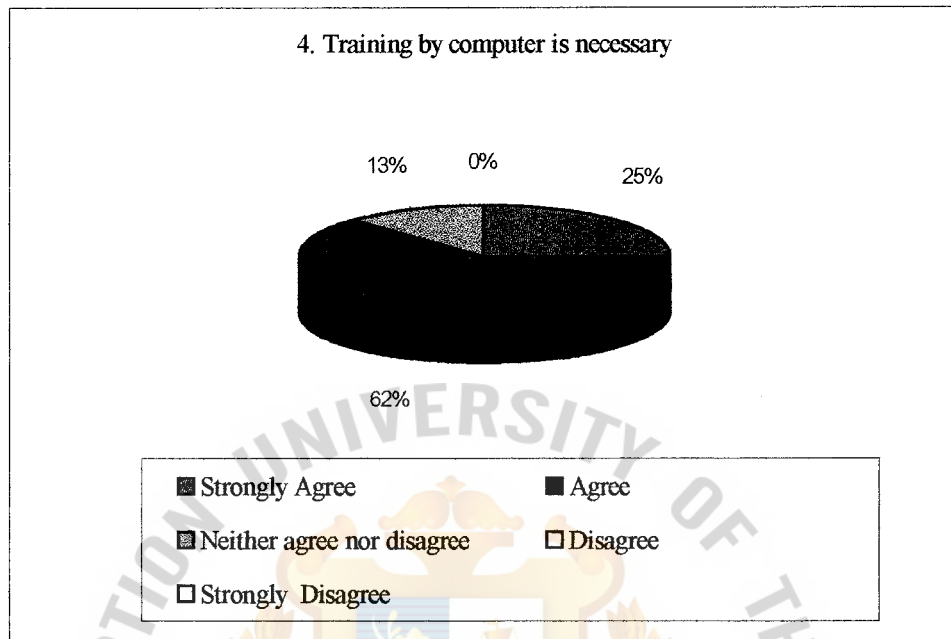


Figure 4.10. Training by Computer Is Necessary.

From the total number of user's attitude of training with computer are necessary shows that strongly agree 25%, agree 65.5% and neither agree nor disagree 12.5%. From the percentage 65.5% agree to train in organization.

(6) Computer Assisted Instruction makes you waste the time

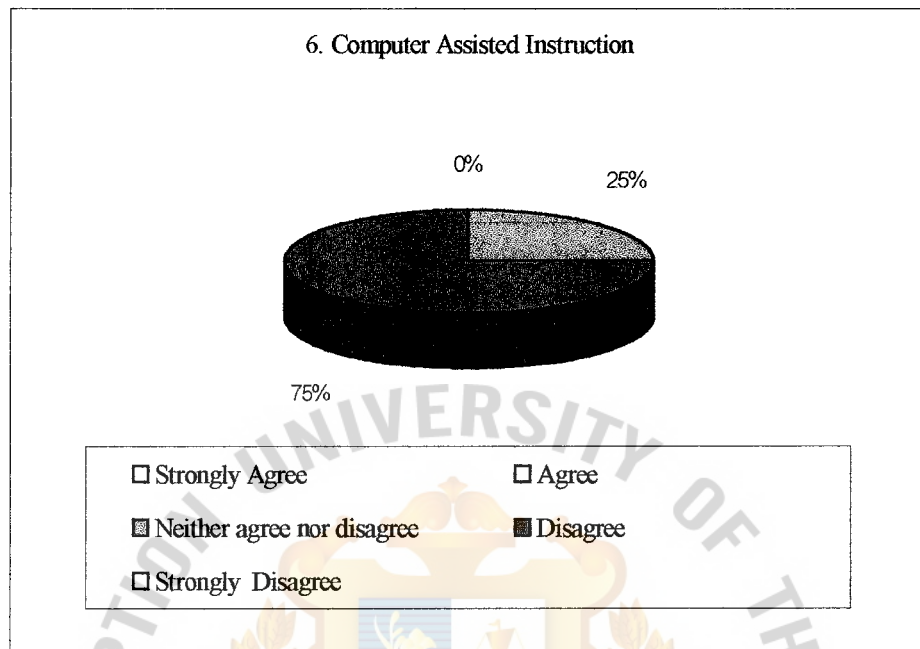


Figure 4.12. Computer Assisted Instruction Makes You Waste the Time.

From the total number of user's attitude about Computer Assisted Instruction on "makes you waste the time" shows that neither agree nor disagree 25% and disagree 75%. From the percentage of 75%, Using Computer Assisted Instruction did not make users waste the time in working in a day.

(7) You have an aim to manage about Quality Control in organization

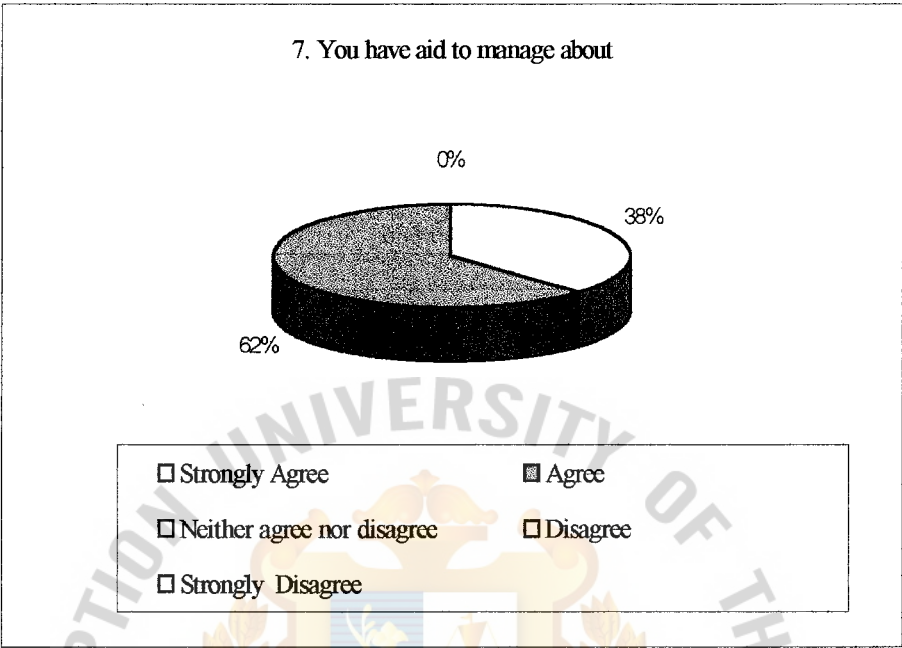


Figure 4.13. You Have an Aim to Manage about Quality Control in Organization.

From the total number of user's attitude about aid to manage about Quality Control in organization shows that strongly agree 37.5% and agree 62.5%. From the percentage of 62.5%, users have aimed to manage Quality Control in organization in order to effective Management after using this program.

(8) You want to train with computer for the next time

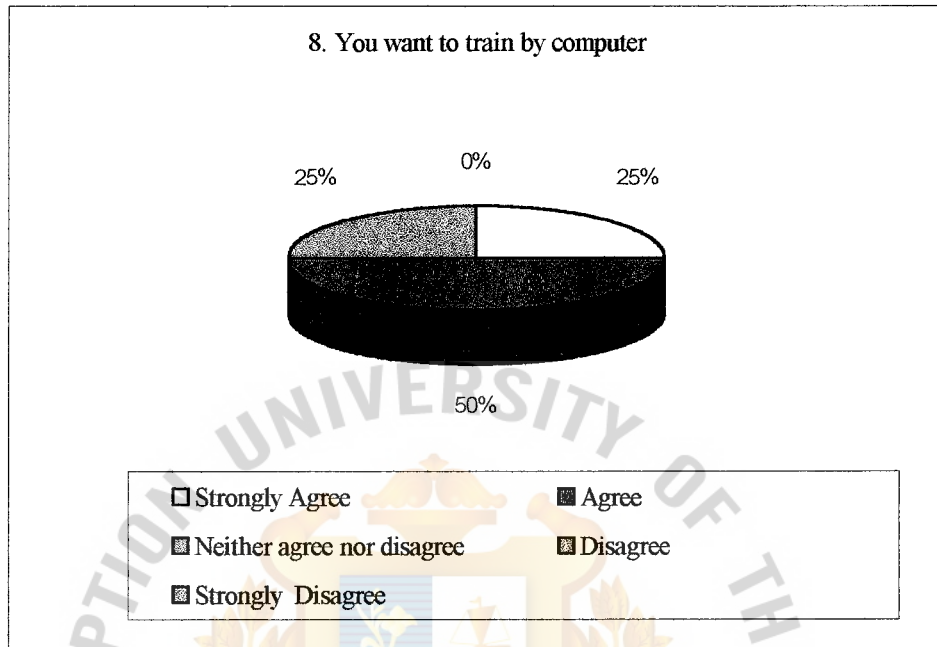


Figure 4.14. You Want to Train with Computer for the Next Time.

From the total number of user's attitude about requirement train with computer for the next time shows that strongly agree 25% and agree 50%, Neither agree nor disagree 25%. From the percentage of 50%, users have required to train with computer for the next time.

(9) Save cost in train employees

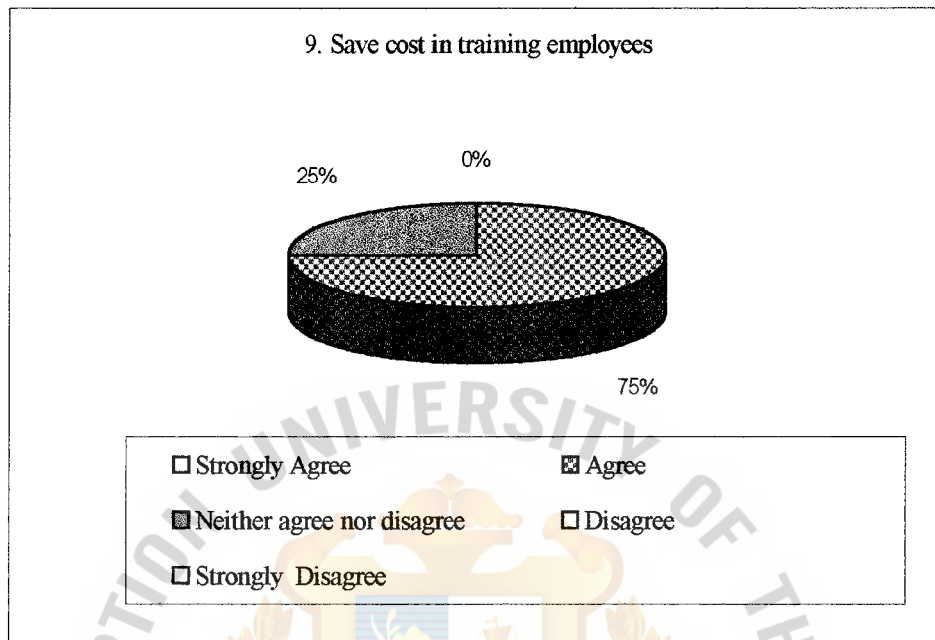


Figure 4.15. Save Cost in Train Employees.

From the total number of user's attitude about requirement train with computer for the next time shows that agree 75%, neither agree nor disagree 25%. from the percentage of 75%, using computer to train employees in the organization can save cost in training of organization.

(10) You can apply for your job after training

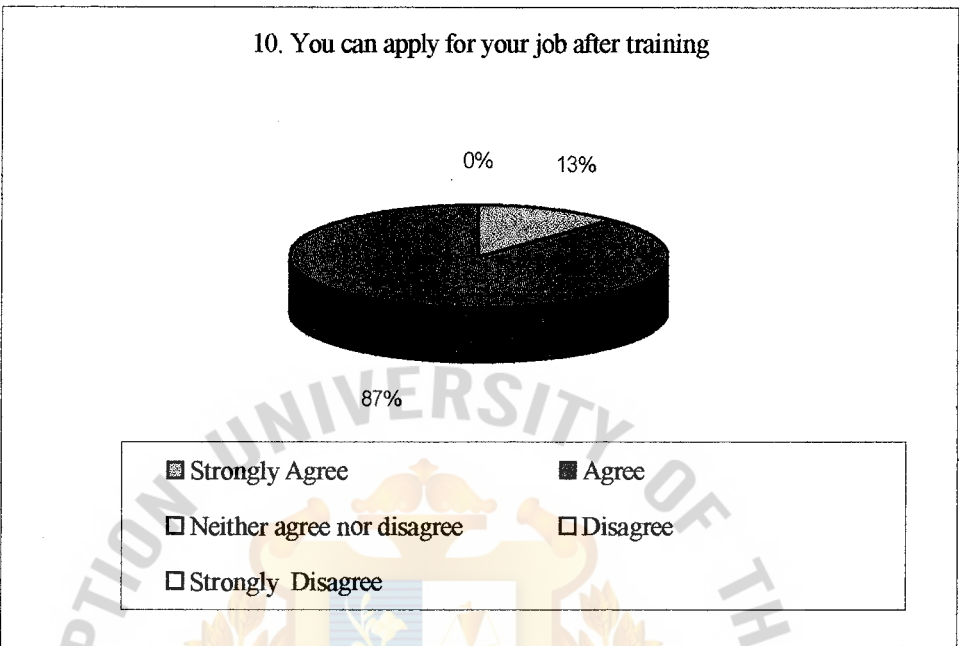


Figure 4.16. You Can Apply for Your Job after Training.

From the total number of user's attitude about applying Quality Control in the job shows that strongly agree 12.5% and agree 82.5%. From the percentage of 82.5%, Using computer to train employees in the organization, users have an attitude to implement Quality Control with their organization for the next time.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Computer Assisted Instruction is the most interactions of learners with a computer in a direct instructional role. The result of this project is a program about Computer Assisted Instruction for quality control system. Authorware programming version 5 develops the Computer Assisted Instruction. It's run on Microsoft Windows in microcomputer. Authorware purposes to teach some particular content in any of a variety of formal with or without any involvement of human trainers.

The feature of Computer Assisted Instruction for Quality Control system is presented by English Version. The lessons can be divided into 3 sections:

- (1) Fundamental Quality Control System
- (2) Quality Control Techniques
- (3) Statistical Quality Control

The result of testing program Computer Assisted Instruction is analyzed from users in quality control department. According to the summary of questionnaires and analyzed the user's attitude in Computer Assisted Instruction for Quality Control system, it can conclude following:

- (1) 62% of users have a better understanding of Quality Control.
- (2) 74% of users active to learn the program because it's easy to understand the concepts and techniques.
- (3) 75 % of users are interested in Computer Assisted Instruction because the program present attractive lessons that have pictures and sound effects in the program.

- (4) 65.5% of users agree that using computer to training in organization is necessary because employees have variety knowledge, so training is important in improving knowledge to the same way.
- (5) 62.5% of users don't have problems after training. 25% have problem in languages because the program is presented in English version that may be confused to users.
- (6) 75% of users show that training with computer is not waste the time but it helps to practice skill in computer too.
- (7) 62.5% of users have aim to manage about Quality Control that after training users have many ideas to be effective management for the organization.
- (8) 50% of users require to train with computer for the next time because it's easy and convenient.
- (9) 75% of users agree that using Computer Assisted Instruction to train or in-house training also helps to save cost of organization for this present.
- (10) 82.5% of users have idea to apply quality control of their responsibility.

5.2 Recommendations

In order to get the completion of Computer Assisted Instruction; some recommendations and further systems are introduced as follows:

- (1) Development Computer Assisted Instruction for training or teaching employees should be developed in Thai version in order to get a better understand .It also applied easily for the job.
- (2) Computer Assisted Instruction should design the narrative of each pages that will be able to attractive learners.

- (3) Computer Assisted Instruction should have self-test both pre-test and post test in order to help learners can measure their knowledge about Quality Control System.
- (4) Computer Assisted Instruction can be upgraded according to the increment for others models such as Inventory Management, Material Requirement Planning (MRP), Just In Time (JIT) and etc. All of these have utilized for factory to train employees for the next time.





APPENDIX A
QUESTIONNAIRE

QUESTIONNAIRE

I am a graduated student of Assumption University. Now I'm conducting a project in Computer Aided Instruction for quality control system, which is in partial fulfillment of the requirements for the degree of Master of Computer and Engineering Management. Your kind answer will help me to understand and analyze your attitude about Computer Aided Instruction for quality control system. Your answers will remain completely anonymous.

Part I Personnel data

1. Gender

☐ Male ☐ Female

2. Age

☐ 22-25 ☐ 26-30 ☐ 31-35 ☐ 36-40 ☐ above 41

3. Education

☐ Senior High School ☐ college ☐ Bachelor's ☐ Graduate or over

4. Education Major

☐ Science ☐ Engineer ☐ Business ☐ Others.....

5. Position

☐ Manager ☐ Supervisor ☐ Engineer ☐ Others.....

6. Experience

☐ less than 1 year ☐ 1-3 years ☐ 3-5 years ☐ more than 5 years

Part II About your attitude in Computer Assisted Instruction for quality control

Detail	Strongly Agree	Agree	Neither agree nor disagree	Dis agree	Strongly Disagree
1.Help you to understand quality control					
2.Help you to active in lesson					
3.Help you to interest more					
4.Training by computer is necessary					
5.You found problem after training					
6.Computer Assisted Instruction makes you waste the time					
7.You have aim to manage about quality control in organization					
8.You want to train by computer for next time					
9.Save cost in training employees					
10.You can apply for your job after training					

Recommendation

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