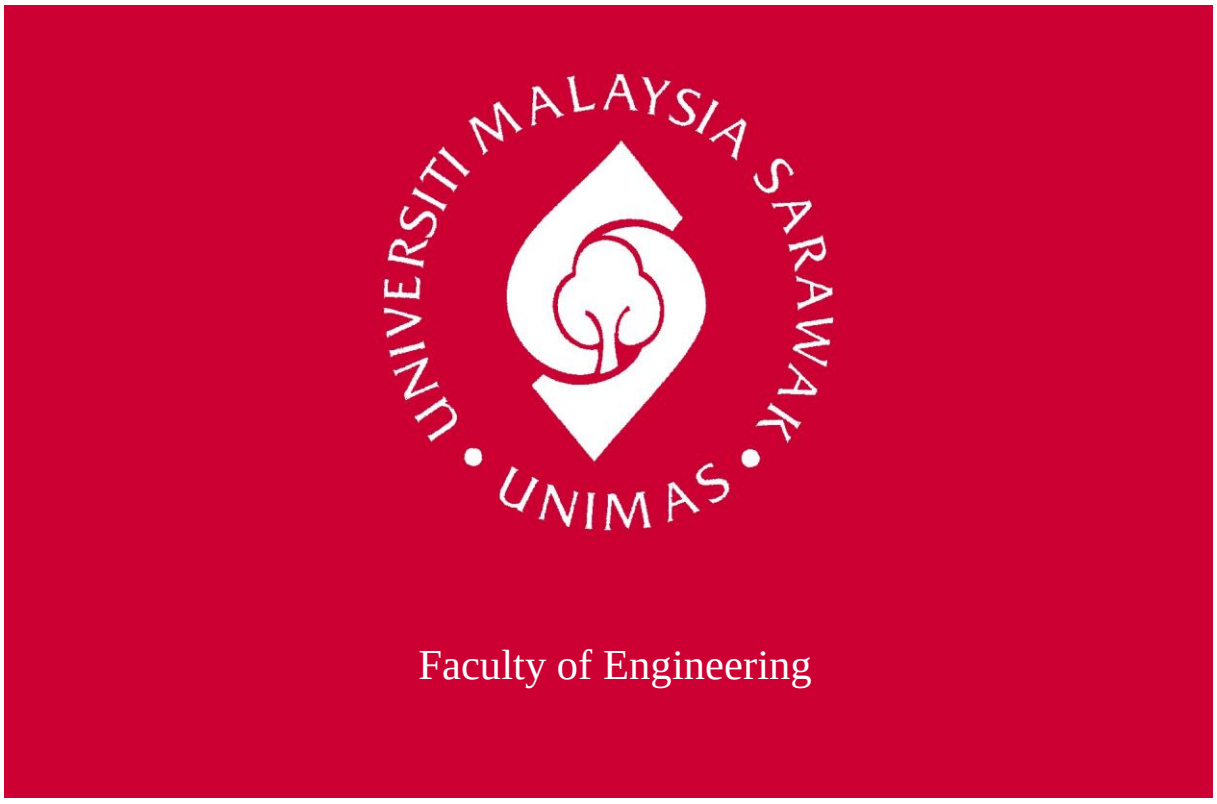

QUALITATIVE STUDY OF QUALITY AWARENESS AND ENHANCEMENT THROUGH INTERACTIVE TRAINING TOOL

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Bachelor of Engineering with Honours
(Mechanical Engineering and Manufacturing System)
2006

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QUALITATIVE STUDY OF QUALITY AWARENESS AND ENHANCEMENT THROUGH INTERACTIVE TRAINING TOOL

WELLI SIONG

This project is submitted in partial fulfilment of
the requirements for the degree of Bachelor of Engineering with Honours
(Mechanical Engineering and Manufacturing System)

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2006

DEDICATION

To My Beloved Family……

ACKNOWLEDGEMENT

First of all, I would like to thanks to my supervisor Mr. A. Rahim Md. Amin for his instruction and his extraordinary concern, advice, cooperation and support throughout his supervision of this thesis project. Without his supports and advices this project might not be done efficiently.

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ABSTRACT

Quality control is very important in today manufacturing industry. This is because many advantages can be obtained when quality control is implemented properly. Those company that implementing quality control in their production for instant, will gain a higher benefit. This shows that education or training program about quality control is very important. The problem faced is lack of appropriate tool for learning and training about quality control. Most of the training and learning process still using traditional method which is using text book.

Based on the fact above, an interactive training tool was developed. This interactive tool will teach the user how to construct control chart. Control chart was selected because of its ability to determine the process capability and for on-line control. Besides that it can also be used for both variable and attribute values.

To test the effectiveness of the interactive tool, a usability test was conducted where 10 participants were selected. The main usability characteristics that had been look into are the technical and subjective characteristic. Based on the result of the evaluation, the author found out that some improvements need to be done. The causes of the problems were because of lack of experience in developing computer interface.

ABSTRAK

Kawalan kualiti merupakan satu perkara yang penting dalam industri pembuatan masa kini. Ini kerana, banyak kebaikan boleh diperolehi apabila mengamalkan kawalan kualiti. Contohnya, apabila syarikat tertentu mengamalkan kawalan kualiti, syarikat tersebut akan mendapat keuntungan yang lebih banyak. Ini menunjukkan bahawa pelajaran dan latihan tentang kawalan kualiti adalah sangat penting. Masalah yang dihadapi adalah, kekurangan alat yang sesuai untuk mempelajari dan membuat latihan tentang kawalan kualiti. Kebanyakan prosess pembelajaran dan latihan masih menggunakan cara yang lama iaitu menggunakan buku.

Berdasarkan fakta di atas, *interactive training tool* telah dibangunkan. *Interactive tool* ini akan mengajar pengguna cara-cara membuat carta kawalan. Carta kawalan dipilih disebabkan kebolehannya untuk menentukan keupayaan prosess dan kawalan *on-line.* Selain itu carta kawalan juga boleh digunakan untuk nilai-nilai *variable* dan *attribute.*

Untuk menentukan keberkesana *interactive tool* yang dibangunkan, satu ujian kebolehgunaan telah dilakukan dimana 10 peserta telah dipilih. Ciri-ciri kebolehgunaan utama yang diuji adalah ciri-ciri teknikal dan subjektif. Berdasarkan keputusan yang diperolehi, pengarang mendapati bahawa terdapat beberapa pengubahsuaian perlu dilakukan. Masalah-masalah yang timbul adalah disebabkan kekurangan pengalaman dalam membangunkan paparan antaramuka.

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CHAPTER 1

INTRODUCTION

1.0 Introduction to Quality Control (QC)

Quality control is the major concern nowadays. There are many definitions about quality. For examples, The American Society for Quality Control defines quality as a perception of someone. This means that everybody has their own definition and understanding about quality. Technically, quality can be defines as:

- The characteristics of a product or service which is satisfy the needs which are already stated before the product is developed.
- A good product or service. Its mean that the product or services is perfect on all of its characteristics.

Deming (1982), describe quality as a system that is perfect. The word "perfect" here means that the product being produce is does not have any defect. According to Juran (1992), the products that have a good quality are a product that ready to be used. Its mean that, if the product have poor quality, it is not very suitable to be used. Beside that Crosby (1996), discusses quality as a products or services that fulfil the stated requirements and a poor quality products or services

do not satisfy the requirement. Beside that, Gryna (2001), state that if the product is in good quality, the customer will satisfy and thus will always use that product.

Quality control was first introduced and implemented in United State of America in 1920. It is used as a tool to improve their industrial production. In its earliest implementation, quality control only covered up limited areas which are just at a certain technical areas. After a period of time, quality control gradually came to be a regular part of company-wide activities. This can be seen clearly when every division in a corporation is responsible for ensuring product quality. The coordination of all division efforts towards this end is called total quality control (TQC). An American namely Mr. A.V. Fegenbaum coined the term total quality control.

1.1 Importance of Quality Control

Quality control is very important in today manufacturing industry. This is because many advantages can be obtained when quality control is implemented properly. Those company that implementing quality control in their production for instant, will gain a higher benefit. According to Freeman-Bell and Balkwill (1993) if the company is well known for is good quality product, this will increase the benefit of the company due to the improvement of the company's sales. This is because if they able to show to their customers that their goods are better than their competitor, their customers will automatically buy or use their product.

Apart from the importance mention above, the following are the other importance of the quality control program. They are

- Improvement in quality of the product or services
- Increase production under the optimum condition
- Reduction in cost per unit
- Reduction in scrap
- Saving material
- Reduction in production bottlenecks
- Evaluation of scientific tolerances
- Reduction in inspection
- Maintenance of operating efficiency
- Quality consciousness
- Fewer customer complaints

1.2 Tools available for quality control

There are many tools that can be used for solving quality problems. Some of the tools available are:

- Flow Chart
- Cause-and-Effect Diagram
- Check Sheet
- Run Chart
- Control Chart

- Histograms
- Scatter Diagram
- Pareto Chart
- Stratification

Their function are to detect problems, narrow problem area, assess factor that seem to cause the problem, determine whether the assumed causes of defects are true or not prevent error due to omission, haste or carelessness, conform the effect of improvement and detect outliers. These nine tools will be discussed further in the literature review.

1.3 Importance of Quality Education and Training

Employee training program is very important. Malaysia also very concern about this matter. This can be proven when there are about 300 training institutions registered in 1999 in Malaysia, Junaidah Hashim (2001). These training institutions are providing training to various companies in Malaysia. This number is large enough to and leads to the competitiveness of training industries. Meanwhile Banks (1989), mention that employee participation in training program is very important. This is because with this program, the employee can maintain their skill level. Beside that Pyzdek (1988) said that it is important to train the employee using the quality control tools, especially using statistical

analysis. This is because statistical analysis is necessary if we want to improve our product quality.

From their statement above, we can see that learning quality is very important because the quality also affected by the amount of on-the-job training that the employee receive. Beside that Banks (1989), also mention that educating our employee will give them many benefits. The benefits are:

- The employee will gain basic knowledge about their job
- Training program will also improve communication
- Minimize mistakes during working
- Training program will also make them aware about their responsible to the company

1.4 Multimedia

Currently multimedia is widely used in many aspects. For example in education field, multimedia is used in training and learning. In business, multimedia is used to advertise new products to the consumer. Rada (1995), give the definition of the word “multimedia” as the mixture of more than one different media to become one which is the system or the interactive tool for my case. These media are including sound or voice, video, graphics, animations or text.

Some of the texts in multimedia are hypertext. This means that the text can be used to enter a different page simply by clicking the text. The advantage of this hypertext is that, there is less text content in one window.

The audio used in multimedia can be the sound of clicking the link, music or it also can be used to replace the text. This means that, instead of using text, audio can be used to give information to someone. The combination of audio and animated graphics is more effective than using text alone.

Video element also very effective when used in the interactive learning tool. Ellis and Childs (1999), in their study on effectiveness of video as a learning tool in online multimedia modules, they made a conclusions and recommendations of:

- Use video stories to put the subject into its context of use
- Use video clips followed by questions to encourage active participation from trainees and build on existing knowledge
- Make sure that the trainees can find the answer to the question in the clips shown
- Limit the length of talking head video clips and use them to elaborate on specific points.

1.5 Interactivity

According to Webster, interactivity can be defined as the interactions that happen between a human being and a computer program. The computer program is interactive unless the program runs without immediate user involvement. This kind of computer program is basically called batch or background program. The example of interactive program is games like football game. The character in the game will move if there is involvement user.

Beside that, example of interactivity can also be found in the World Wide Web. This is because the user will interact with the browser (Web application program). Beside that, the user will also interact with the pages that the browser brings to him. The hypertext in the web is the most common interactivity. This is because when the user clicks on the hypertext, it will bring the user to the other related page. Beside that interactivity also allowed user to make input to the Web or non-Web application. The inputs are including typing commands or clicking the mouse. Because of the interactivity, any input from user will give output to the user. Example of output is displaying images.

1.6 Available Interactive learning and training tools.

Interactivity is very useful when it is implemented in the learning and training environment. It is because it will make the course or the training session