INTEGRATION OF KANO'S MODEL AND SERVQUAL INTO QUALITY FUNCTION DEPLOYMENT FOR DEVELOPING ENVIRONMENTAL MANAGEMENT SYSTEM TRAINING PROGRAM

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ABSTRACT

Environmental Management System (EMS) is a very important knowledge to any industrial organization in order for them to make sure that the environmental management elements in their organization are well maintained and according to the law. It is very important for the industrial management and workers to know and understand the correct EMS knowledge & concept. Because of that it is very important for them to attend sufficient and relevant EMS training in order for them to attain the OSH knowledge. These training must be effective and have sufficient impact. For that purpose a new method is used in this research. The Kano's Model and SERVQUAL are been integrate into the Quality Function Deployment (QFD) for the purpose of developing an EMS training course that would not only satisfy the requirement and needs of the industry but also unexpected factors towards the trainee that attend the course. By using this method we can see that the level of understanding for the training participant using this new model is higher compared to the level of understanding for the participant from the conventional EMS training program that been conducted by the training provider. With the increment in the level of understanding the level of effectiveness for doing EMS related job for the training participant would also be different. We can prove this by using the Kirkpatrick's Evaluation Model, whereby we would evaluate the trainee from the conventional EMS training program against the newly develop EMS training program. The evaluation would be based on their level of

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understanding and the level of effectiveness of doing EMS related jobs in their respective workplace.

***Keywords*:** Environmental Management System; Training; House of Quality (HOQ), Kano's Model, Kirkpatrick's Evaluation Model

1. INTRODUCTION

A good employee is a worker that can perform excellently on the task given as stated in the Job Description and the Key Performance Index. In order to fulfill the Job Description and Key Performance Index, every employee should have adequate skills and knowledge.

They can obtain the skills and knowledge by attending courses related which provided by the employer or external trainer. A good course is a course that put into consideration of the needs of the customers and fulfils them. Customer in this context is the employer of the said worker. This study provides a new perspective on a new method of constructing skills and learning course based on the needs of the employer by using Quality Function Deployment (QFD). In theory, the course model produced will grant maximum output to the employer. In order to measure the employer's satisfaction, it is suggested to use Kirkpatrick Evaluation Model. This model measures the performance of staff who has attended the training program and it is also used to measure the results of the employer's investment by sending their staff to undergo the training program.

2. LITERATURE REVIEW

2.1 Kano Model

Kano et al. (1984) developed a model for improvement and enhancement of a product or service. According to Kano, customer needs can be classified into three categories (Kano, 1995, 2001; Bergman and Klefsjo, 2003), the categories are must be, one dimensional and attractive. For the must be categories the need can be considered as the basic requirements for the product or services. Both the customer and the service or product provider agreed on the importance of the needs in these categories, they are expected but unspoken and unarticulated (Cheng Lim et al., 1999). For these categories of needs the level of satisfaction for the customer will not raise above the normal level if the product or service provider able to fulfill those needs but the customer will felt very disappointed if the needs are not fulfilled. In other words while a low performance on such attributes leads to dissatisfaction in a customer; a high performance does not lead to satisfaction (Kano et al., 1984; Matzler and Hinterhuber, 1998; Busacca and Padula, 2005). Meanwhile for the one dimensional categories, the needs that falls in these categories are actually the expectation of the customer towards the product function or the services that been provided by the service provider. These needs are very well expected, expressed and articulated by the

customer. For the needs in this categories it can be expressed in a linear relationship, whereby if the customer needs are not fulfilled the level of satisfaction will be low and in other hand if the needs are fulfilled the level of satisfaction will become high (Redfem and Davey, 2003) and by providing for such needs, the product or service provider creates the expected quality for their product or services. It is important for the product and service provider to focus their resource to compete with their competitor in order for them to sustain themselves in the market. Lastly would be the attractive dimension. The needs that fall in this categories are the customer needs that they themselves doesn't realize that the need it. In other words the needs are unexpected and unspoken. The relationship between the needs in this categories and the customer satisfaction are one way linear relationship. If the product or service provider are able to provide the unexpected towards the customer, their level of satisfaction will increase, however if the satisfaction level will not been effected if the product or service provider attribute in this category are not performed well. In other words they lead to satisfaction of customers when present but do not lead to any dissatisfaction if not present (Berger et al., 1993) and by discovering such needs and expectations, and providing the customer with these, the product or service provider creates what can be called, the attractive quality (Kano et al., 1984; Lilja and Wiklund, 2006). By integrating the Kano Model and SERVQUAL we would able to determine the service quality criteria that falls into the must be, one dimensional and attractive category. This information will be an important input towards the creating a training courses model.

2.2 SERVQUAL

Service Quality is one of the main factors that can contribute to the success or failure of a manufacturing or service organization in today's competitive environment. (Kuei and Lu, 1997) considered service quality as a critical determinant criterion for competitiveness. Compare to product quality whereby it can be easily determine, service quality is very intangible and qualitative, The customer have to undergo the service in order to determine the level of service provided to them. (Parasuraman et.al., 1985, 1988) suggest that in a service setting, customer judge its quality by comparing their perceptions of what they receive with their expectations of what they should have received, (Kim et.al. 2003) have determine two key elements in the attainment of high quality. The first one is the identification of customers service requirements and expectations whereby it is generally recognized that consumers evaluate the service they receive and their expectation are critically important in determining whether or not they are satisfied (Brown and Swartz, 1989). It can be simplify that the consumers' expectations are the key criteria to the quality of service that a firm delivers. The second key factor of service quality is customer perception (Zeithaml, 1988) suggest that the notion of perceived quality reflects the opinion of the customer regarding the superiority or global excellence of a product or service. Finally (Parasuraman et. al. 1985, 1989) suggest that service quality should be represented as the difference or gap between service expectation and actual service performance. He also suggest that service quality can be measure using the SERVQUAL scale consist of a set of 22 questions build from the five SERVQUAL dimensions; reliability, assurance, tangible, empathy and

responsiveness. In this research we will used the Modified SERVQUAL scale whereby we add two more dimensions to the current SERVQUAL dimensions: competence and content. These two dimensions are very crucial dimension in determining the service quality for training program. In the end we also add eight new question towards the 22 SERVQUAL question making the total question become 30. We can used the set of 30 question to determine the strength and weakness of the current training courses model and at the same time it can be integrate with the Kano Model analysis to determine the training courses must be, one dimensional and attractive criteria.

2.3 Quality Function Deployment (QFD)

Quality Function Deployment can be considered an outstanding matrix diagram that can be used as a powerful tool for product development. It involves the integration between different department in an organization like the Design Department, Quality Department, Manufacturing Department and even the Marketing Department. (Griffin, 1992) considered QFD as an investment in people and information. It enables an organization to measure customer "wants" and map them against the engineering "how" in a way that highlights trade-offs and drives the product's design towards customer requirements (Vonderemse and Ragunathan, 1997) QFD facilitates the growth and prosperity of a firm by developing an array of products that are attractive to existing and new customers (Akao, 1990; Cohen, 1988; Hales, 1994). Products designed with QFD may have lower production cost, shorter development time, and higher quality than products developed without QFD (Graessel, 1993; Hunter, 1994; Raynor, 1994). These benefits are attracting an increasing number of product development practitioners to the QFD methodology (Akao, 1990; Ealey, 1988; Garvin, 1988; King, 1989). Although manufacturing industries were the first to adopt QFD, service and government organizations are also using it in their efforts to improve performance (Garvin, 1987; Hauser and Clausing, 1988; Kogure and Akao, 1983; Sullivan, 1986 and 1988). Based on we can say that QFD is one of the most appropriate tools that can be used to develop a training course model using the customer requirements that we obtained using the integration of Kano Model and Modified SERVQUAL. The new training courses model will have all the necessary criteria that are needed to increase the level of satisfaction of the trainee.

2.4 Kirkpatrick Model

Training evaluation is a very crucial step in determining the level of effectiveness for training program. (Kirkpatrick, 1994) had designed a model with four level of evaluation. Those levels are reaction to the training, learning measures, behavior measures and results. (Steensma and Groeneveld, 2009) explain the method of evaluation for each level. The explanation is as stated below.

1. Reactions to the training

Trainees are asked if they enjoyed the training and if they have learned from it.

2. Learning measures

For example, if the purpose of a training program is to increase knowledge, an appropriate knowledge test should be used to determine whether the trainees have actually learned from the training. So, learning measures test retention of training material.

3. Behavior measures

Behavior measures indicate the extent to which the training transfers to the job, to the workplace of the trainee.

4. Results

Results measures are used to show whether broad, often more long-term organizational goals are attained through the training. Measures used may vary from return on investment to lower sickness absenteeism or even reduction of turnover. The link between the training and such long-term results is, of course, often not clear. More often than not, long-term results are affected by multiple causes, and training may be only one of the many possible causes. Still, careful utility assessments and other large-scale evaluations are useful instruments to indicate the effectiveness of the training on this fourth level of evaluation.

It is very important for us to use this evaluation model to measure the effectiveness of the newly develop training program and compare it with the results from the traditional training models.

3. RESEARCH OUTCOME

A survey was conducted to 118 industrial workers in the state of Johor, Malaysia. Based on Survey 1 the SERVQUAL dimensions have been modified whereby in the case of training provider there should be two more dimensions added to the original SERVQUAL dimensions. The new dimensions are Trainer Competency and Course Contents. The SERVQUAL questionnaire is also been modified by adding eight more questions as a tool to measure the new dimensions. Below are the modified SERQUAL dimensions and the respective questions that are related to each one of it.

Dimensions	No of Questions
Tangible	4
Reliability	5
Responsiveness	4
Assurance	4
Empathy	5
Trainer Competency	4
Course Contents	4

Table 1: Modified SERVQUAL

The research continues by conducting another survey using the integration of Kano Model into the SERVQUAL Questionnaire. The results have shown training competency and course

contents), one dimension falls into the one dimensional categories (empathy) and two dimensions falls into the attractive categories (responsiveness and assurance). The surveys also have shown the level of satisfaction for the traditional training program based on the Modified SERVQUAL dimensions. The results are stated in Table 2:

Dimensions	Satisfaction Level
Tangible	76%
Reliability	77%
Responsiveness	70%
Assurance	72%
Empathy	70%
Trainer Competency	71%
Course Contents	72%
Average	73%

Table 2: Training Participant Level of Satisfaction for Traditional Training Program

From the results we can say that the weaknesses in the traditional training program are responsiveness and empathy. These two dimensions must be improved in order to increase the level of satisfaction among the training participants. Next is the process of constructing a training program (in this case it would be the Environmental Management System Training Ptogram) based on the findings above using QFD. The program would focus on the attractive factors and at the same time improve the weak factors. In the end a training program that can overcome the weakness of a traditional training program and provide an attractive input can be constructed and run by the training provider. An Environmental Management System Training Program is later conducted to 30 industrial workers. Survey 2 is then conducted after the participants have finished attending the training courses and the results are as follows.

Measurements	Traditional Training Courses Program	Newly Develop Training Courses Program	Difference in Percentage
Reaction to the Training	71%	92%	19%
Learning Measurements	72%	91%	19%
Behavior Measurements	70%	90%	20%
Results	73%	94%	21%
Average	71.5%	91.75%	20.25%

Table 3: Comparison of the Training Model.

Survey 2 also has able to determine the level of satisfaction for the newly develop training program based on the Modified SERVQUAL dimensions. The results are stated in Table 4:

Dimensions	Satisfaction Level
Tangible	91%
Reliability	92%

Responsiveness	92%
Assurance	92%
Empathy	91%
Trainer Competency	95%
Course Contents	95%
Average	92.5%

Table 4: Training Participant Level of Satisfaction for the Newly Develop Training Program

Dimensions	Traditional Training Courses Program	Newly Develop Training Courses Program	Difference in Percentage
Tangible	76%	91%	15%
Reliability	77%	92%	15%
Responsiveness	70%	92%	22%
Assurance	72%	92%	20%
Empathy	70%	91%	21%
Trainer Competency	71%	95%	24%
Course Contents	72%	95%	23%
Average	73%	92.5%	19.5%

Table 5: Traditional Training Program versus Newly Develop Training Program

From the Table 3 we can see clearly that the difference of performance between the ordinary training courses model and the newly develop training courses model is 20.25%. This is a very significant value and can play a major factor for the staff performance and also for the company's return on investment in staff training. Based on Table 5 we may conclude that the level of satisfaction increase rapidly (19.5%). This is a prove that the newly develop training program is better than the traditional training program in every aspect of the Modified SERVQUAL dimensions.

4. CONCLUSION

By integrating Kano Model and SERVQUAL into QFD, a process of constructing an EMS training course model which can fulfill customer's needs and wants can be created. This model can overcome linear problem or SERVQUAL model. This new model can produce EMS training program which consists of unexpected aspects. This can be achieved by using Kano's Model. Service provider also will obtain benefit through this model. With QFD, training provider can identify the needs that needed to be prepared in order to complete the EMS training course program. Finally we can see that by using this method we can increase the level of reaction, learning, behavior and results of the EMS training participant.

5. RESEARCH FRAMEWORK

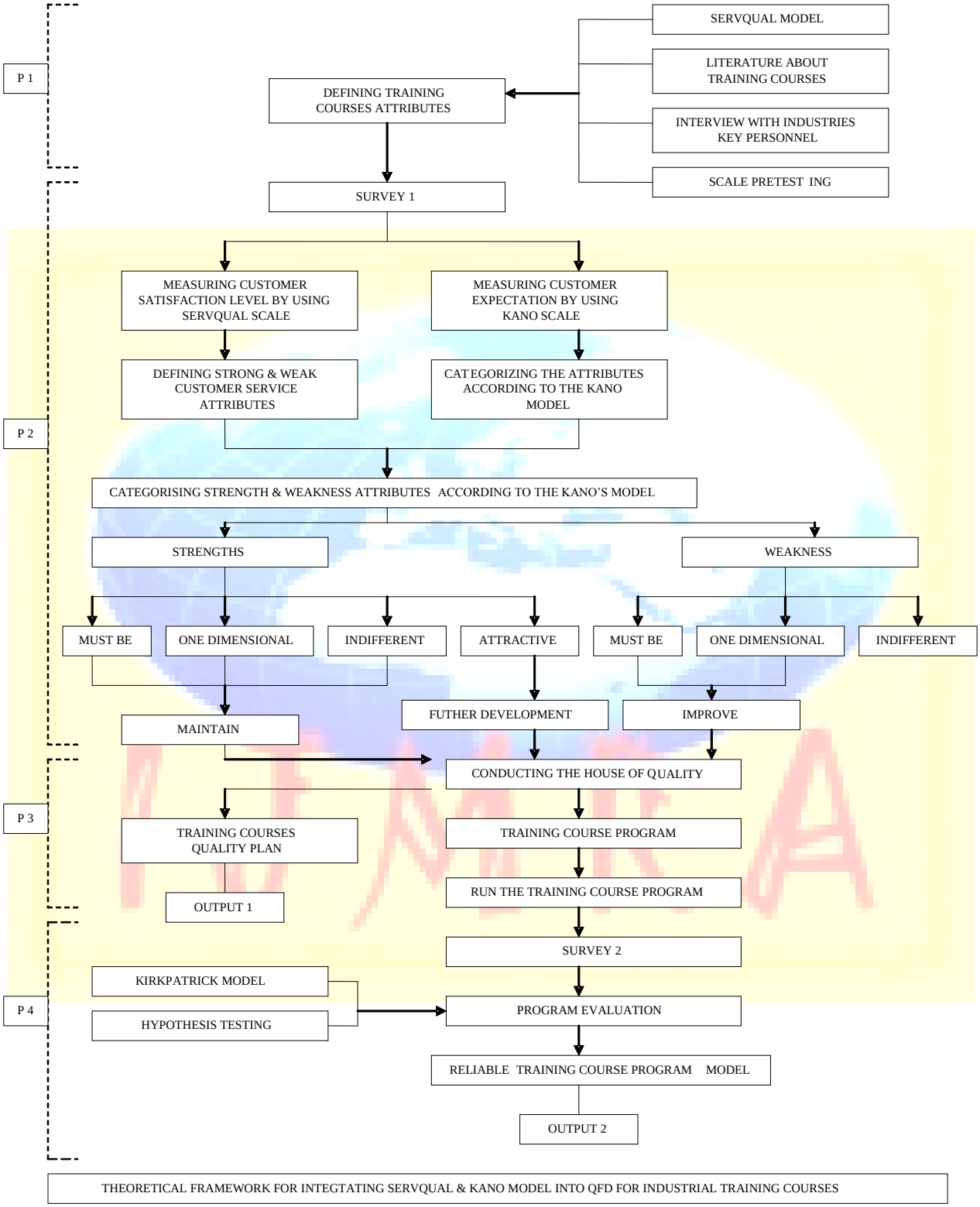

Figure 1: Integration of Kano Model and SERVQUAL into QFD to Construct Training Course Model

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