Full Length Research Paper

# Evaluating solutions of administrative service recovery for elementary schools: Case study of remote rural area in Taiwan

# Ya-Ching Yeh

Doctoral Program of Educational Entrepreneurship and Management, Department of Education, National University of Tainan, No. 33, Sec. 2, Shu-Lin St., Tainan City 700, Taiwan (R.O.C.). E-mail: yaching0315@yahoo.com. Tel: +886-6-2133111 ext.761.

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It is worthy to concentrate on the issue of service recovery due to the fact that the service failures occur frequently in the administrative service system in elementary schools. The main purpose of this paper is to apply the quality function deployment (QFD) model to evaluate the solutions of administrative service recovery for elementary schools in Taiwan remote rural area. The proposed systematic steps of the QFD model are to perform the empirical survey. Study results show that the top four solutions of service recovery for elementary schools in Taiwan are 'strengthening of education and training for employees,' 'regular review meetings,' 'establishment of standard operational procedure (SOP),' and 'top executives coming forward to solve problems and to apologize,' respectively. Furthermore, some discussions of these four solutions were remarked in conclusion.

Key words: Quality function deployment (QFD) model, service recovery, elementary schools.

# INTRODUCTION

There are several administrative functions (e.g., academic, student affairs, general affairs and counseling) influencing the overall service quality improvement and service efficiency for elementary schools (Yeh, 2011). Due to the fact that school service industry is one type of the non-profit service ones (Ting, 2009). Hence, it is a type of mental stimulus processing (Lovelock and Wirtz, 2011) embedded in the service ones. The service receiver and innate character of this type service are people and intangible actions, respectively. Service providers and customers are two major characters in school service industry. Other roles include the principal, teachers, administration employee and relevant technicians (Yeh, 2011). Teachers are the main providers of educational activity as well as the receivers of school administrative service. Administrative employee and relevant technicians are assistants in school service performance. As to students, students' parents, social people and enterprise sponsors are regarded as external customers, among them, students and their parents are considered as receivers and important influencers of education program and administration service. Social people and enterprise

sponsors are categorized as school supervisors. In such a school service of customer-oriented industry, the provision of high-quality services has changed from the operational and tactical issues into strategic issues, which becomes the school organizations' commitment to their customers (Grönroos, 2000; Yang et al., 2011).

Since the salient features of service quality include intangible, simultaneous occurrence of produce and consumption, perishability and heterogeneity, it is more difficult to be evaluated than quality of tangible product. Based on the PZB model developed by Parasuraman et al. (1985, 1988), the quality can be evaluated by the gap between expected service (ES) and perceived service (PS). Then, three types (Grönroos, 2000) of perceived quality are appeared; they are high quality, acceptable quality, and bad quality, respectively. According to Yeh's study in 2011, when the bad administrative service qualities (ASQs) (that is, ES<PS) are measured, showing that such ASQs should be improved from the perspectives of teachers. On the other hand, the high ASQs or acceptable ones should be maintained. However, as machines or personnel in a service system may

sometimes go out of order or make mistakes, and therefore, result in service failures (Grönroos, 2000), that make the services with one hundred percent quality a mission impossible. Thus, how to evaluate if the ASQs provided by elementary schools can satisfy the needs of teachers and what kind of solutions can be used to remedy their ASQs were the motives behind this study.

Briefly, the ASQs really affect teachers' satisfaction (Yeh, 2011) in the elementary schools. When the customers are not satisfied, the issues of service failure and service recovery are emerged (Grönroos 2000); hence, the evaluation of solutions of service recovery is essential to study. Thus, it is worthy to concentrate the issue of service recovery due to the fact that the service failures occur frequently in the administrative service system in elementary schools. Based on the Yeh's study in 2011, there are gaps between importance and satisfaction among the ASQs for elementary schools. It would be considered to propose the executable solutions to solve the gaps problem for the customers. In light of this, a model of quality function deployment (QFD) is a suitable approach to explain this circumstance. Therefore, this paper is based on the Yeh's study, which involved the ASQs of elementary schools in the remote rural area of Taiwan, to evaluate the solutions of administrative service recovery for elementary schools. In summary, the aim of this paper is to evaluate the solutions of administrative service recovery for elementary schools in Taiwan remote rural area. We will describe step-by-step procedures to evaluate this issue in the course of this study.

# CONCEPTS OF QFD MODEL

The QFD model (Ding, 2009) can be used to translate customer requirements into product specifications. It is a tool to deploy the voice of customer (VOC) into searching for best solutions of product development. In this paper, we used the concepts of QFD model to develop the procedures and to identify the solutions of ASQs for elementary schools. In the QFD model, the customer requirement planning (CRP) phase is a matrix, also called the "house of quality (HOQ)," which uses matrices to show multiple relationships between customer's requirements (that is, 'what' ASQs needed to improved) and technical specifications (that is, 'how' the solutions of service recovery have to be made). In this paper, the matrices of HOQ are used for organizing the selected ASQs and evaluating priorities of solutions of service recovery.

The typical chart of the HOQ (the American style) is shown in Figure 1, which consists of six basic steps. The difference between the American style and the Japanese style of HOQ is that latter one lacks Area E in Figure 1. Due to the fact that the Japanese style is easy to use, hence, the Japanese style will be applied in this paper.

1) Area *A* represents customer needs and requirements, which is the VOCs to be identified. In this paper, those needs and requirements are the selected criteria of ASQs in the Yeh's study in 2011. There are 21 selected criteria of ASQs needed improvements in the quadrant 2 and 3 in the Yeh's study in 2011.

2) Area *B* represents the relative importance of criteria of the selected ASQs.

3) Area *C* represents design requirements or technical specifications, which means 'how' the solutions of service recovery have to be

made. In this paper, this 'how' question is the main issue, which is identified solutions of service recovery.

4) Area *D* represents relationship matrix, which is the core element of the HOQ. In this paper, the relationship strength is shown with linguistic variables, e.g., high, medium, low, or non.

5) Area *E* represents correlation matrix, which expressed how design requirements affect each other. Correlations are showed with symbols or a rating scheme of 1-3-9 or linguistic variables.

6) Area *F* represents target values of design requirements. In this paper, the priority of solutions of service recovery can be measured.

# SYSTEMATIC STEPS OF QFD MODEL

The systematic steps of QFD approach are proposed below.

## Step 1: Identify customer needs

In this paper, the customer needs are those twenty-one selected ASQs needed improvements in the Yeh's study in 2011. The eleven ASQs in quadrant 2 'concentrate here' and ten ASQs in quadrant 3 'low priority' are suggested to be improved in this paper.

The twenty-one selected ASQs are shown as following, and their codes are shown in the parentheses. These include a library with plentiful books ( $C_1$ ), complete sport and play facilities ( $C_2$ ), convenient and sanitation facilities of drinking water ( $C_3$ ), plentiful and clean toilets ( $C_4$ ), complete working facilities ( $C_5$ ), delicious and nutritious lunch ( $C_6$ ), correct and updated information ( $C_7$ ), communication skills and EQ performance of each department / unit staff ( $C_8$ ), flexibly and correctly handle administrative issue ( $C_9$ ), respect teaching autonomy of teaching  $(C_{10})$ , and department / unit staff can recognize the hard work paid by teaching group  $(C_{11})$ , free access for the disabled  $(C_{12})$ , clean working environment Clean working environment  $(C_{13})$ , immediately handle any shortage or recovery damaged facilities (C14), administrative staff is able to quickly respond to any issue in detail ( $C_{15}$ ), plan training / study programs based on teachers' needs  $(C_{16})$ , offer teacher the information regarding curriculum design and teaching materials compiling  $(C_{17})$ , support teacher to develop teaching program and follow teaching schedule ( $C_{18}$ ), assist the arrangement of internal / external competition and provide support  $(C_{19})$ , department / unit staff took the initiative to communicate with teacher ( $C_{20}$ ), and listen and recognize the inner voice of teacher  $(C_{21})$ , respectively.

# Step 2: Compare the ASQs between the importance and satisfaction degrees

The twenty-one selected ASQs can be measured by Likert's 5-points to evaluate the gaps between importance and satisfaction degrees. If the latter is bigger than the former, it implies the ASQ of elementary school is okay. On the other hand, if the former is bigger than the latter, it implies that there would be some solutions to be identified, and then proceeding with the Step 3. In this paper, the author will evaluate these gaps for the twenty-one selected ASQs via QFD questionnaire.

## Step 3: Identify the suitable solutions

The direction of this 'how' issue will be thought from identifying solutions of service recovery, which are expressed by academic literature (Chen, 2008, 2009; Cheng, 2007; Chou et al., 2009; Davidow, 2003; Grönroos, 2000; Hoffman et al., 1995; Karande et al., 2007; Lovelock and Wirtz, 2011; Miller, 2000; Smith et al., 1999; Wirtz and Mattila, 2004) and suggested by the school principals,



Figure 1. House of quality (HOQ). Source: Ding (2009).

administrative directors, and educational experts. Finally, the eight suitable solutions of ASQs of service recovery for elementary schools are suggested as following, and their codes are shown in parentheses. These include top executives coming forward to solve problems and to apologize ( $A_1$ ), quick response ( $A_2$ ), the announcement of corrections ( $A_3$ ), the provision of good communication channel ( $A_4$ ), strengthening of education and training for employees ( $A_5$ ), regular review meetings ( $A_6$ ), a database built based on past experience with complaint handling ( $A_7$ ), and establishment of standard operational procedure (SOP) ( $A_6$ ), respectively.

#### Step 4: Calculate the priorities of customer needs

As mentioned in the Step 2, the importance and satisfaction degrees for each ASQs are compared to obtain the average values of all importance and satisfaction levels. The priorities of the selected ASQs have to calculate to evaluate the perception of the VOCs. This is because that the higher the importance levels and the lower the satisfaction levels, the higher the selected ASQs of customer needs should be improved. In this step, we use the method in Yeh (2011) study to obtain the weights of VOCs.

### Step 5: Construct the relationship matrix

The relationship matrix can be constructed to link between the selected ASQs of elementary schools and suitable solutions of service recovery. Let  $x_{ij}^{h}$ , i = 1, 2, ..., n; j = 1, 2, ..., m; h = 1, 2, ..., N; be the linguistic relationship value given to  $i^{th}$  selected ASQ corresponding to  $j^{th}$  suitable solution by  $h^{th}$  expert. The linguistic relationship values in the position (i, j) of the matrix should be transferred into exact values firstly, and then calculate the integrated relationship values  $R_{ij}$  by arithmetic mean method. For example, four experts evaluate High=3, Medium=2, Low=1, and Low=1, respectively for  $C_1$  corresponding to  $A_1$ , then the integrated relationship values can be calculated by  $R_{11}=(3+2+1+1)/4=1.75$ .

Hence, the integrated relationship matrix can be constructed as  $[R_{ij}]_{n\times m}$ .

## Step 6: Calculate the relationship strength and rank the priority

Let  $R_{ij}=x_{ij}$ , i = 1, 2, ..., n; j = 1, 2, ..., m, be the integrated relationship

values in the relationship matrix. After integrating the opinions of all *N* experts, the relationship strength corresponding to each suitable solution can be denoted by  $RS_j = \left(\sum_{i=1}^n x_{ij}\right)/n$ , j = 1, 2, ..., m. Then, we can rank the suitable solutions of service recovery.

# **RESULTS AND DISCUSSION**

In this paper, the author combined the twenty-one selected ASQs of elementary schools and eight suitable solutions of service recovery to construct a matrix table to evaluate the relationship strength. Due to the fact that the relationship strength is generated by a group of professional experts (Robbins, 1994); hence, the seventeen experts of the school principals, administrative directors, and educational experts, most are working sixteen to twenty years, were selected to fill in the QFD questionnaire of this survey.

Continually, the author used the systematic steps of the proposed QFD model to obtain the final results, which can be shown as Table 1. The detailed construction of HOQ in Table 1 is described as follows.

Firstly, the right side of Table 1 shows the mean of importance (*I*), mean of satisfaction (*P*), original weights (*OW*), and standard weights (*SW*), respectively. The results show that all the arithmetic averages of importance degree are larger than the satisfaction degrees for each ASQ in the Table 1. Then, the ranking of the important ASQs is evaluated. The top five key ASQs should be improved to have first priority. They are 'plentiful and clean toilets ( $C_4$ ),' 'library with plentiful books ( $C_1$ ),' 'complete sport and play facilities ( $C_2$ ),' 'convenient and sanitation facilities of drinking water ( $C_3$ ),' and 'communication skills and EQ performance of each department / unit staff ( $C_8$ ),' respectively.

Secondly, the middle of Table 1 shows the relationship matrix. Four linguistic variables were designed in the QFD questionnaire to measure the relationship degree for each ASQ corresponding to each suitable solution. A group

Variable	<b>A</b> 1	A <sub>2</sub>	A <sub>3</sub>	<b>A</b> 4	<b>A</b> 5	A <sub>6</sub>	<b>A</b> <sub>7</sub>	<b>A</b> 8	1	Р	OW	SW	R
<b>C</b> 1	0.121	0.237	0.316	0.311	1.641	2.641	0.124	1.692	4.485	3.059	6.395	0.0742	2
<b>C</b> <sub>2</sub>	0.501	0.675	0.311	0.210	1.311	1.349	0.137	2.341	4.336	2.988	5.844	0.0678	3
<b>C</b> <sub>3</sub>	1.897	0.897	1.349	1.648	2.411	2.041	1.397	2.640	4.751	3.538	5.762	0.0669	4
<b>C</b> 4	1.975	2.146	2.160	2.641	2.641	2.341	1.069	2.064	4.646	3.035	7.488	0.0869	1
<b>C</b> 5	1.945	1.467	2.109	1.064	1.971	1.679	0.920	2.164	4.304	3.542	3.281	0.0381	15
<b>C</b> <sub>6</sub>	2.419	2.469	2.641	2.064	2.611	2.043	1.162	2.067	4.231	3.355	3.706	0.0430	12
<b>C</b> <sub>7</sub>	1.216	1.971	1.967	2.110	1.437	1.697	1.930	1.649	4.634	3.649	4.565	0.0530	7
<b>C</b> <sub>8</sub>	2.457	2.046	1.943	2.011	2.247	2.641	1.064	2.643	4.490	3.424	4.789	0.0556	5
C <sub>9</sub>	2.541	2.461	0.611	2.109	2.697	2.341	1.374	2.591	4.495	3.633	3.878	0.0450	10
<b>C</b> <sub>10</sub>	2.049	2.109	2.194	1.610	2.107	1.697	1.864	2.637	4.309	3.536	3.334	0.0387	14
<b>C</b> <sub>11</sub>	2.470	2.691	2.641	2.164	2.473	1.983	1.034	2.031	4.314	3.585	3.147	0.0365	16
<b>C</b> <sub>12</sub>	1.467	1.674	2.106	2.097	2.513	1.942	0.394	1.309	4.430	3.469	4.257	0.0494	8
<b>C</b> <sub>13</sub>	1.897	2.167	2.109	2.211	2.148	1.674	0.642	2.394	4.379	3.522	3.754	0.0436	11
<b>C</b> <sub>14</sub>	1.742	1.341	1.697	1.967	1.873	2.167	0.264	0.694	4.560	3.533	4.682	0.0543	6
<b>C</b> 15	1.421	2.106	2.694	1.697	2.430	1.974	1.934	2.394	4.237	3.608	2.663	0.0309	20
<b>C</b> <sub>16</sub>	2.410	1.346	2.610	2.009	1.954	2.347	1.793	2.364	4.143	3.463	2.819	0.0327	19
<b>C</b> <sub>17</sub>	2.169	2.397	1.941	2.169	2.430	2.392	1.643	2.371	4.137	3.610	2.180	0.0253	21
<b>C</b> <sub>18</sub>	2.641	2.431	0.941	1.991	1.642	2.164	0.620	2.164	4.308	3.585	3.112	0.0361	17
<b>C</b> <sub>19</sub>	1.847	2.340	0.691	2.197	2.497	1.649	0.310	0.694	4.209	3.537	2.829	0.0328	18
<b>C</b> <sub>20</sub>	1.874	1.697	0.341	2.213	2.130	1.349	0.103	0.364	4.293	3.309	4.222	0.0490	9
<b>C</b> <sub>21</sub>	1.697	1.031	0.210	1.943	1.067	1.397	0.163	0.467	4.441	3.629	3.450	0.0400	13
RS	1.8455	1.7952	1.5991	1.8303	2.1062	1.9766	0.9496	1.8921					
R	4	6	7	5	1	2	8	3					

Table 1. The results of solutions of service recovery for elementary schools by using QFD model.

Nomenclature of  $C_1$ - $C_{21}$  and  $A_1$ - $A_8$  can be referred to the steps 2 and 3 of the previous section. Besides, I = mean of importance, P= mean of satisfaction, OW = original weights, SW = standard weights, RS = relationship strength, and R = rank, respectively.

participant with seventeen experts is collected to calculate the relationship matrix. After obtaining the relationship matrix, the author used the Step 6 in the previous section to calculate the relationship strength ( $RS_j$ ). Then, the solutions can be ranked, and these results are shown on the bottom of Table 1.

Finally, the empirical results show that the ranking of eight solutions of service recovery for elementary schools in Taiwan are 'strengthening of education and training for employees  $(A_5)$ ,' 'regular review meetings  $(A_6)$ ,' 'establishment of SOP  $(A_8)$ ,' 'top executives coming forward to solve problems and to apologize  $(A_1)$ ,' 'the provision of good communication channel  $(A_4)$ ,' 'quick response  $(A_2)$ ,' 'the announcement of corrections  $(A_3)$ ,' and 'a database built based on past experience with complaint handling  $(A_7)$ ,' respectively.

# CONCLUDING REMARKS

When the customers are not satisfied, issues of service failure and service recovery emerged. The evaluation of solutions of service recovery is essential to study. In this paper, the author follows the Yeh (2011) study which discussed the ASQs really affect the teachers' satisfaction in the elementary schools. Hence, it is worthy to concentrate the issue of service recovery due to the fact that the service failures occur frequently in the administrative service system in elementary schools.

The main purpose of this paper is to apply the QFD model to evaluate the solutions of administrative service recovery for elementary schools in Taiwan remote rural area. The proposed systematic steps of the QFD model are to perform the empirical survey. Then, twenty-one ASQs and eight suitable solutions of service recovery are adopted to design the QFD questionnaires in this paper. Finally, the empirically results show that:

(1) To acquire VOCs, the top five key ASQs should have the improvements, including 'plentiful and clean toilets,' 'library with plentiful books,' 'complete sport and play facilities,' 'convenient and sanitation facilities of drinking water,' and 'communication skills and EQ performance of each department / unit staff,' respectively.

(2) The ranking of eight solutions of service recovery for elementary schools in Taiwan are 'strengthening of education and training for employees,' 'regular review meetings,' 'establishment of SOP,' 'top executives coming forward to solve problems and to apologize,' 'the provision of good communication channel,' 'quick response,' 'the announcement of corrections,' and 'a database built based on past experience with complaint handling,' and respectively.

In summary, some discussions were presented for the top four solutions of service recovery for elementary schools in Taiwan remote rural area. Furthermore, the top four solutions of service recovery are suggested to be paid more attention by the elementary schools in Taiwan remote rural area.

1) For strengthening of education and training for employees. When the plans and strategies of the service recovery are made, it is essential to execute the employees' education and training, including emotional outsiaht. emotional handle, skills of personnel communications, judgment, etc. The employees' education and training are critical due to the fact that strengthening of education and training can improve the abilities to reply to service failures. It is suggested that the school principals, administrative directors, and the person in charge should focus on the ASQs and try to participate the employees' education and training in order to avoid the occurrence of service failure in the administration service of elementary schools.

2) For regular review meetings. It is a good interaction and smooth communication channel between service provider and teachers in the elementary schools. The regular review meeting should to be held to make improvement and avoid the similar failures from happening again. Opinion exchanges between service provider and teachers can not only improve their relationship but also facilitate their cooperation, which can further lead to continuous progress in the elementary schools.

3) For the establishment of SOP. The main causes of service failures need to be identified and a SOP should be built to make remedial measures for service failures more complete and accurate, thereby to raise customer satisfaction level. As most service failures will happen unexpectedly, there should be a set of SOPs in place to ensure that proper response can be made immediately after a service failure and that all details are taken into account and problems can be handled in an organized manner.

4) For top executives coming forward to solve problems and to apologize. When there are service failures, teachers will sometimes ask the top executives to come forward to solve problems. In this case, the school principals, administrative directors, and the person in charge should present themselves to apologize and explain or even make reasonable compensations. In any service failures, the school principals, administrative directors, and the person in charge should immediately offer apology to teachers to assuage their worries and anger. Besides, when there is a service failure, the school principals, administrative directors, and the person in charge need to explain the reason to teachers to reduce their anxieties and increase their confidence.

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## REFERENCES

- Chen QP (2008). Using the quality function deployment in education service quality: A case study on the elementary school in Yunlin County. Master thesis, National Taiwan University of Science and Technology, Taiwan.
- Chen YJ (2009). Using the technique of importance-performance analysis to explore service quality in the kindergarten. Educ. Pol. Forum, 12(4): 153-177.
- Cheng HW (2007). A study on the service quality of elementary school: take Taichung as an example. Master thesis, Chung Hua University, Taiwan.
- Chou TY, Hsu CL, Chen YT (2009). The analysis of service recovery improvement technology for mobile phone distributors. Commer. Manag. Quart., 10(3): 409-438.
- Davidow M (2003). Organizational responses to customer complaints: What works and what doesn't. J. Serv. Res., 5(3): 225-250.
- Ding JF (2009). Applying fuzzy quality function deployment (QFD) to identify solutions of service delivery system for port of Kaohsiung. Qual. Quant., 43(4): 553-570.
- Grönroos C (2000). Service Management and Marketing: A Customer Relationship Management Approach (2<sup>nd</sup> ed.). UK: John Wiley & Sons Inc.
- Hoffman KD, Kelly SW, Rotasky HM (1995). Tracking service failure and employee recovery efforts. J. Serv. Mark., 9(2): 49-61.
- Karande K, Magnini VP, Tam L (2007). Recovery voice and satisfaction after service failure: An experimental investigation of mediating and moderating factors. J. Serv. Res., 10(2): 187-203.
- Lovelock C, Wirtz J (2011). Services Marketing: People, Technology, Strategy (7<sup>th</sup> ed.). Taipei: Pearson.
- Miller JL, Craighead CW, Karwan KR (2000). Service recovery: a framework and empirical investigation. J. Oper. Manag., 18(4): 387-400.
- Parasuraman A, Zethaml VA, Berry LL (1985). A conceptual model of service quality and its implications for future research. J. Mark., 49(4): 41-50.
- Parasuraman A, Zethaml VA, Berry LL (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. J. Retail., 64(1): 12-40.
- Robbins SP (1994). Management. New York: McGraw-Hill.
- Smith AK, Bolton RN, Wagner J (1999). A model of customer satisfaction with service encounters involving failure and recovery. J. Mark. Res., 36(3): 356-372.
- Ting SC (2009). A study of the development and factorial structure of a school service quality scale. Educ. Rev., 33: 115-158.
- Wirtz J, Mattila AS (2004). Consumer responses to compensation, speed of recovery and apology after a service failure. Int. J. Serv. Ind. Manag., 15(2): 150-166.
- Yang LJ, Chou TC, Ding JF (2011). Using the importance-performance analysis (IPA) approach to measure the service quality of mobile application stores in Taiwan. Afr. J. Bus. Manage., 5(12): 4824-4834.
- Yeh YC (2011). Evaluating administrative service quality of elementary schools: A case study of remote rural area in Taiwan. Afr. J. Bus. Manage., 5(14): 5966-5973.