

# Using the Modified Delphi Method to Construct the Quality Indicators of the Counseling Service System

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## Abstract

The counseling service system is a case management tool used by professional guidance counselors and full-time teacher-counselor. However, the system satisfaction and willingness to use were generally low. This study used the modified Delphi method to construct the quality indicators of the counseling service system. The study found the quality indicators of the system can be divided into five major dimensions and 23 evaluation indicators to explore. There were three indicators most valued by experts and users, which were the functions are simple and convenient to operate, the project meets the needs of the work, and the efficiency and convenience of paper processing are improved. Based on the research results, this study puts forward substantive implications for academics and management.

*Keywords:* System Quality Indicator, Modified Delphi Method, Counseling Service System

## 1. Introduction

The counseling service system developed by the Tainan Students Guidance and Counseling Center is a case management website, which is intended to assist professional counselors and full-time counselors in the school's three-level counseling. Caring for students and tracking their developmental effects and achieve the role of transmitting information between the center and schools. The main function of the e-counseling service system is to record case data, consultation records, referrals and other operations. However, past studies have found that, Elementary and secondary teachers' satisfaction and willingness to use are both low. The main influencing factors come from the user's perceived usefulness of the system and poor system quality,<sup>1,2</sup> in view of the fact that the sample of relevant research in the past was based on elementary school teachers, there are still other relevant units' opinions

that have not been presented. This study attempts to fill in the evaluation basis for the quality of the counseling service system by adding expert suggestions from different backgrounds. Based on the above background, this study conducted interviews with experts on the current status of the system and used the modified Delphi method (MDM) to perform indicator analysis, with a view to constructing quality indicators for the counseling service system for management units As a basis for improving system gaps, improving user satisfaction and willingness to use.

## 2. Literature Review

### 2.1 System quality

The service quality point of view regards the organization as the goal of providing customers with high quality services and has a collection of multiple processes.<sup>3</sup> Its definition is based on the comparison

between the service expected by users and the service they feel,<sup>4</sup> and service quality can be applied to the information system functions, because the information system can be regarded as a service function to deal with the information needs of the organization. Therefore, this study defines system quality as "the information system provider delivers services to users through the website environment, and the user's overall evaluation of the service."

Zeithaml et al. proposed a conceptual framework for online service quality, which measures website service quality in 11 dimensions.<sup>5</sup> These 11 dimensions were readjusted into seven dimensions in 2002, including efficiency, reliability, completion, privacy, responsiveness, compensation, and contact. Among them, the four items of efficiency, reliability, completeness and privacy form the e-SERVQUAL scale, which mainly measures customer satisfaction with the online functions provided by the website, and the three items of responsiveness, compensation and contact form the recovery e-SERVQUAL scale is mainly used for the service that customers hope to get when they have questions or encounter problems.<sup>6</sup>

Since then, there have been many studies to modify the measurement indicators of online or website service quality. For example, the Electronic Retailing Quality Scale (E-TailQ) uses 14 items to evaluate the quality of e-tailing commerce;<sup>7</sup> there is also e-Core Service Quality Scale (ES-Qual) (including Efficiency, fulfillment, system availability and privacy etc. four dimensions) and e-Recovery Service Quality Scale (E-RecS-Qual) (including responsiveness, compensation and contact and other three dimensions), both of which are a scale that can measure the performance of website services.<sup>8</sup> Among them, the seven facets extracted by Parasuraman et al.<sup>8</sup> are roughly the same as Zeithaml et al.,<sup>6</sup> Parasuraman et al.<sup>8</sup> only changed reliability to system availability, but the definition of the two is the same.

In summary, whether it is the E-TailQ scale or the ES-Qual scale, both are based on rigorous statistical analysis and empirical research and have been verified in subsequent studies since their development,<sup>9,10</sup> At the same time, it is consistent with the theme of this research. According to this, this research adopts the structure of the two as the basis of the prototype of the system quality index.

## 2.2 The prototype of the system quality indicators

This study refers to the system service quality<sup>9,10</sup> and the related research of elementary school full-time teacher-counselor on the counseling service system,<sup>1</sup> and Initially summarize the system quality indicators into five dimensions: tangibility, reliability, responsiveness, caring and certainty, and develop 23 system quality assessment items (Table 1).

Table 1. A summary of the quality evaluation indicators of the counseling service system

Dimensions	No.	Indicators
<b>Tangibles</b>	A1	The proper layout
	A2	Information on all options is available
	A3	Easy to learn how to use
	A4	The function is simple and convenient to operate
	A5	It is easy to find the information you need
<b>Reliability</b>	B1	The project is rich and complete
	B2	The project meets the needs of the job
	B3	Improve the confidentiality mechanism
	B4	Stable use and operation
	B5	Web-to-web connections are fast and smooth
<b>Assurance</b>	C1	Helps communicate work matters
	C2	Helps improve performance
	C3	Improve the efficiency and convenience of paperwork
	C4	Reduce the cost of physical information or archives
<b>Responsiveness</b>	D1	Be able to quickly resolve questions and special needs
	D2	Can inform the service response time
	D3	Have good professional training
	D4	There are regular maintenance personnel
	D5	Website system failures are dealt with immediately
<b>Empathy</b>	E1	The expression of the web page is clear
	E2	Protection of information
	E3	Be able to understand the problem quickly
	E4	Have a good service attitude

## 3. Research Methods

### 3.1 Modified Delphi method

Murry and Hammons took to correct the typical German illegality is to use literature review to organize and develop a prototype questionnaire, instead of the typical Delphi method's open questionnaire as the first round of survey, that is the MDM.<sup>11</sup> Based on the use of the MDM, it can fully reflect the opinions of experts, brainstorm ideas, and have high accuracy.<sup>12</sup>

### 3.2 Opinion consistency and stability evaluation

In this study, two standards of quartile difference (Q.D.) and standard deviation (S.D.) were used to verify the consistency of expert opinions.<sup>13</sup> In the standard of interquartile range, this study adopted the suggestion of Holden and Wedman. When the interquartile range of the question is less than or equal to 0.6, the expert opinions are highly consistent, and between 0.6-1.00, the expert opinions are moderately consistent, and >1.00 it means that the expert opinions are not unanimous. In the standard deviation standard, when the standard deviation of the item is <1.0, it means that the expert opinions are consistent, and if the standard deviation is >1.0, it means that the expert opinions are not consistent. If the expert opinions of more than 85% of the items agree, the questionnaire will be completed.<sup>14</sup>

The stability of this study was based on the number of changes in the opinions of experts was less than 20%, as the distribution of opinions of the expert group on individual topics reaches the minimum standard of stability.

### 3.3 Indicator evaluation and suggested directions

This study was based on the prototype of the system

quality indicators compiled in the literature, as the first revised Delphi questionnaire, and used the Likert five-point scale to measure the importance of the system quality elements. 1 is divided into "very unimportant", 5 is divided into "very important". According to the consensus of the first round of questionnaires, the second round of questionnaires will be compiled. Repeat the questionnaire by analogy until the questionnaire reaches a stable result. Finally, according to the average and mode to illustrate the importance of the indicators in this stage and ranking, if the scores are the same, ranking with stability.

## 4. Research Results

### 4.1 Selection results of the second round of the revised Delphi questionnaire

After completed the first round of questionnaire interviews with 16 experts in related fields, due to the inconsistencies in the indicator items, the second round of interviews was conducted. In the second round, the consensus has been reached according to expert opinions. Therefore, the expert interview phase was ended, and the indicators were formed (Table 2).

Table 2. Results of the first round and second round of interviews

Dimensions	First round						Second round						Overall ranking
	No.	Mode	Mean	Q.D.	S.D.	Rank	No.	Mode	Mean	Q.D.	S.D.	Rank	
Tangibles	A1	4	4.00	0.00	0.63	5	A1	4	3.88	0.38	0.81	5	22
	A2	4	4.19	0.50	0.75	4	A2	5	4.56	0.50	0.51	3	8
	A3	5	4.56	0.50	0.51	2	A3	5	4.63	0.50	0.62	2	6
	A4	5	4.75	0.38	0.45	1	A4	5	4.81	0.00	0.40	1	2
	A5	5	4.31	0.50	0.95	3	A5	5	4.56	0.50	0.63	4	8
Reliability	B1	4	3.88	0.38	0.81	5	B1	4	4.19	0.50	0.75	5	17
	B2	5	4.44	0.50	0.63	1	B2	5	4.75	0.00	0.58	1	3
	B3	5	4.44	0.50	1.03	2	B3	5	4.75	0.38	0.45	2	3
	B4	4	4.31	0.50	0.70	3	B4	5	4.69	0.50	0.48	3	5
	B5	4	4.00	0.88	1.03	4	B5	5	4.31	0.50	0.87	4	15
Assurance	C1	4	3.81	0.88	0.91	4	C1	4	4.00	0.75	0.73	4	21
	C2	4	4.06	0.50	0.93	3	C2	4	4.38	0.50	0.50	3	12
	C3	5	4.31	0.50	1.01	2	C3	5	4.56	0.50	0.51	1	8
	C4	5	4.44	0.50	0.63	1	C4	5	4.44	0.50	0.81	2	11
Responsiveness	D1	4	3.88	1.00	1.09	5	D1	4	4.19	0.50	0.66	3	17
	D2	3	3.50	0.50	0.73	4	D2	4	3.69	0.50	0.95	5	23
	D3	4	4.06	0.88	0.77	3	D3	4	4.06	0.38	0.68	4	20
	D4	4	4.13	0.50	0.72	1	D4	5	4.38	0.50	0.81	1	12
	D5	4	4.06	0.38	0.68	2	D5	4	4.25	0.50	0.58	2	16
Empathy	E1	4	4.50	0.50	0.52	2	E1	5	4.63	0.50	0.50	2	6
	E2	5	4.63	0.38	0.81	1	E2	5	4.88	0.00	0.34	1	1
	E3	4	4.06	0.50	0.85	3	E3	5	4.38	0.50	0.72	3	12
	E4	4	4.00	0.75	0.73	4	E4	4	4.13	0.38	0.62	4	19

After two rounds of questionnaire interviews, we obtained data with expert consistency and stability convergence, and obtained the results of the experiment. It will be evaluated according to five system quality dimensions. In "tangibility", "functional operation is simple and convenient" is the most important; in "reliability", "the project meets the needs of the work" is the most important; in "efficiency", to "improve the efficiency of word processing and Convenience is the most important; in "responsiveness", "specialized maintenance" is the most important; finally, in "caring", "protection of information" is the most important, and it is also the highest score of all items. The experts attach great importance to the attitude of the system management unit or industry to protect student data.

From the experimental results, we can see the importance of the major dimensions. Overall, experts attach great importance to the security and rigor of the confidentiality and rigor of the information of the system itself and the administrator, and secondly, whether the system is actually helpful to the work. Since the e-counseling system used by Tainan City at this stage has not been universally recognized by users, the results of this study can be used by its management and maintenance units as a direction for improvement.

## 5. Conclusion

In addition to the e-counseling system being used in Tainan City, counselors in other counties, cities, or institutions also use similarly functional student counseling record systems, but the designs are different, and the usage situation are also different. This study used the MDM to collect the opinions of experts from various units and obtains an indicator of system quality. In addition to providing the system management unit in Tainan City as a reference indicator for regular maintenance, it can also be used by other government agencies or school institutions to construct the basis for maintaining the relevant system of student consultation records, in order to take into account the user's point of view and the importance of subsequent maintenance and management in the system development process.

## References

1. H.-H. Liu. A Study of the Counseling Service System Satisfaction for Teacher-Counselor in Tainan Elementary School. *Journal of Robotics, Networking and Artificial Life*, **8**(3), 2021, pp. 197-200.
2. H.-H. Liu. Assess the Critical Factors for the

3. Counseling Service System Usage Intention, *Proceedings of the 2021 International Conference on Artificial Life and Robotics*, Japan, January 2021.
4. B.L. Myers, L.A. Kappelman, V.R. Prybutok. A Comprehensive Model for Assessing Quality and Productivity of the Information Systems Function: Toward a Theory for Information Systems Assessment. *Information Resources Management Journal*, **10**(1), 1997, pp. 6-25.
5. A. Parasuraman, V.A. Zeithaml, L.L. Berry. A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing*, **49**(4), 1985, pp. 41-50.
6. V.A. Zeithaml, A. Parasuraman, A. Malhotra. A Conceptual Framework for Understanding E-Service Quality: Implications for Future Research and Managerial Practice. Mass: Marketing Science Institute, Cambridge, 2000.
7. V.A. Zeithaml, A. Parasuraman, A. Malhotra. Service quality delivery through web sites: A critical review of extant knowledge. *Journal of the Academy of Marketing Science*, **30**(4), 2002, pp. 362-375.
8. M. Wolfinbarger, M.C. Gilly. eTailQ: Dimensionalizing, measuring and predicting e-tail quality. *Journal of Retailing*, **79**(3), 2003, pp. 183-198.
9. A. Parasuraman, V.A. Zeithaml, A. Malhotra. E-S-QUAL: A multiple-item scale for assessing electronic service. *Journal of Service Research*, **7**(3), 2005, pp. 213-233.
10. M. Laxmi. A Study of Reviewing Country and Industry Specific E-Service Quality Dimensions. *Journal of Critical Reviews*, **7**(16), 2020, pp. 3741-3748.
11. P. Rita, T. Oliveira, A. Farisa. The impact of e-service quality and customer satisfaction on customer behavior in online shopping. *Heliyon*, **5**(10), 2019, e02690.
12. J.W. Murry, J.O. Hammons. Delphi: A Versatile Methodology for Conducting Qualitative Research. *The Review of Higher Education*, **18**(4), 1995, pp. 423-436.
13. S. Thangaratinam, C. Redman. The Delphi Technique. *The Obstetrician & Gynaecologist*, **7**(2), 2005, pp. 120-125.
14. K.W. Brooks. Delphi Technique: Expanding Applications. *North Central Association Quarterly*, **53**(3), 1979, pp. 377-385.
15. M.C. Holden, J.F. Wedman. Future Issues of Computer-mediated Communication: The Results of a Delphi Study. *Educational Technology Research and Development*, **41**(4), 1993, pp. 5-24.

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