Enhancing English Learning Website Content and User Interface Functions Using Integrated Quality Assessment

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Abstract. The present study investigated the applicability of an integrated quality assessment approach to assess English learning website quality. The study used the Kano Model to identify attractive quality attributes of the content and user interface functions of an English learning website. The Importance-Satisfaction Model was used to determine the interface functions that need to be improved. Findings of the study led to the conclusion that the content and user interface functions of English learning websites should be specially developed according to the satisfaction level of the learners and also the degree of importance perceived by them. On the basis of the key quality attributes identified by utilizing the integrated quality assessment model developed in this study, English learning website designers can make important decisions on specific areas for enhancing the quality of the website and improving the learning efficiency of the users.

Keywords: English as a foreign language (EFL), English learning, computer-assisted language learning (CALL), Internet-assisted language learning, e-learning, educational technology.

1 Introduction

With the advent of the digital age and the proliferation of educational technology, effective integration of e-learning can be very advantageous in higher education [1]. As the current learning websites are being updated at a torrid pace, educators and website designers should continuously assess the quality of the latest technology from different aspects [2]. In particular, technical improvements in the actual learning content and interface functions can give rise to enhanced learning outcomes.

In the CALL context, many e-learning websites have been developed worldwide, but little research has been conducted concerning the development of comprehensive evaluation criteria [3]. To develop students' necessary English skills in the global information society with the most convenient and practical means, it is of significance to further improve the existing Internet-assisted language learning tools. These tools already possess the practical advantage of being readily available to the students. In spite of the huge demand for user-friendly language learning websites and materials, most of them still lack standardized management and consistent quality at the current time [4]. The vast amount of learning materials in e-learning has also brought about

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the challenge of using suitable learning materials for a particular learning topic, creating the need for user recommendation within a learning context [5]. What English learning websites require is constant feedback from the perspective of the users in context, so that users' quality of learning can be improved [6].

In the broad field of quality assessment, many methods are available for investigating requirement characteristics of the users. Of the range of methods available, one of the widely utilized methods by academic researchers and industries is the Kano Model. A few examples of domains that the practical research tool has been applied to include website design [7], web-based learning [8], and product design optimization [9]. In the EFL context, Sung [10] conducted a cross-national study that utilized the Kano Model to identify attractive quality attributes of English language teaching at two universities from two East Asian countries.

Whilst the Kano Model is an established tool for sorting quality attributes into various categories, the comparatively new Importance-Satisfaction Model (I-S Model) can be considered a simple yet powerful tool for finding out the *excellent* attributes and the *to be improved* attributes [11]. Analytical results derived from the I-S Model allow identification of quality attributes that need to be improved upon. This key function provides important guidelines for quality decisions. Based on the analyses and decisions, required actions can then be initiated for quality improvement.

Two of the most important dimensions of an e-learning website are its content quality [12] and user interface design [13]. Therefore, English learning website designers committed to providing an effective language learning experience to users should not only focus on the aesthetics and the sheer amount of learning material that they can place on a website. Instead, they should also highlight the strengths and weaknesses of the existing design and the content area for improvement. In view of these critical aspects, integrating the Kano Model and the I-S Model with the aim of obtaining more valuable quality information becomes a strategic move.

Taking into account the functional versatility of the Kano Model and the useful applications of the I-S model, it can be presumed that the integrated approach holds promise as a fitting tool for assessing website quality in the virtual English learning environment. For these reasons, the Kano Model and the I-S Model were chosen and integrated to be applied to this study.

The purpose of this study was to investigate the applicability of an integrated quality assessment approach to assess English learning website quality via user feedback information. With the aim of achieving the stated purpose, the following objectives were formulated to guide the study:

1. To examine students' perceptions regarding English learning through web-based e-learning;
2. To classify attractive learning content;
3. To determine interface functions that require immediate improvement.

2 Methodology

This section presents the research design and procedures for the study. First, the participants' background information will be introduced. Next, the learning content of

the English learning website and instrumentation used in this study will be illustrated. Lastly, the procedures of data collection and data analysis will be presented.

2.1 Population and Sample

The target population for this study represented all university freshmen from a selected university in northern Taiwan during the Spring semester of 2010. Cluster sampling was employed to randomly select six classes from six different colleges with varying majors. This method is appropriate for educational research situations where the population members are grouped in classes. The sample participants for the investigation included 219 freshmen.

2.2 Weekly Use of the Website

All participating students used the online English website under study weekly for 18 weeks throughout the Spring 2010 semester. The learning content of the website is divided into five thematic units including daily life, living environment, transportation, recreation, and holidays and festivals. The units contain anywhere from seven to 13 lessons for a total of 52 different topics altogether. The intention behind this design was for students to learn one lesson per week throughout the year. For this study, students were randomly assigned two lessons per week for a total of 36 lessons.

Students were asked to use all eight interface functions under investigation including vocabulary, pictures, pronunciation, related phrases, dialogue practice, slang, idioms, and test to learn the materials. Moreover, in-class quizzes specifically designed to reinforce consistent use of the eight interface functions were administered on a weekly basis.

2.3 Instrumentation

A survey instrument was designed to collect data for this study. The items of the survey developed were in accordance with the actual learning content and interface functions of the website. The survey contains 39 items and is divided into four parts: (1) English learning websites, (2) quality attributes of website content, (3) quality attributes of the interface functions, and (4) importance level and satisfaction level of the interface functions. There are 18 items in the first part, five items in the second part, eight items in the third part, and eight items in the fourth part.

In each item on the instrument, there is a five-point Likert-type scale for participants to choose from. Part 1 of the instrument uses a scale which ranges from 5 (strongly agree) to 1 (strongly disagree). Part 2 and part 3 were structured in reference to the Kano Model. These parts use a five-point Likert-type scale which ranges from 1 (very satisfied) to 5 (very unsatisfied). Part 2 aims to investigate how students would feel if a particular thematic unit was either implemented or unimplemented. Part 3 aims to investigate how students would feel if a particular interface function was either implemented or unimplemented. Each item in part 2 and part 3 requires the participants to provide a pair of responses. The first in each pair, a functional item, refers to a situation in which the thematic unit or interface function is implemented.

The second in the pair, a dysfunctional item, refers to an opposite situation in which the same attribute is unimplemented.

Part 4 of the questionnaire is structured in reference to the I-S Model. Similar to parts 2 and 3, this part also uses a five-point Likert-type scale (1, very important to 5, very unimportant for the degree of importance and 1, very satisfied to 5, very unsatisfied for the satisfaction level). The questionnaire aims to identify quality attributes of interface functions that need immediate improvement. Each item in this part requires the participants to provide a pair of responses as well. The first in each pair deals with the degree of importance of the quality attribute. The second deals with the satisfaction level of the quality attribute.

2.4 Data Collection

At the end of the 18-week semester, the researcher distributed the survey questionnaires to the 219 students from the six classes under study. The researcher specified that the results derived from the questionnaires were going to be reported for research purposes only and no individuals were going to be identified. The time needed to complete the questionnaires was approximately 15 minutes. Proper ways to complete the questionnaire, especially parts 2, 3, and 4, were carefully explained by the researcher.

With the intention of obtaining the best results, the students were given sufficient time to complete the questionnaires. The researcher also encouraged the students to carefully select their best response. All questionnaires were returned directly to the researcher for data analysis.

2.5 Data Analysis

Upon return of the survey questionnaires, all data were checked first to detect if they were usable. Of the 219 questionnaires returned, Two (0.91%) were found to be incomplete and four (1.83%) contained invalid data that could not be categorized. Two-hundred and thirteen (97.3%) were complete and useable for data analysis. All usable data from the questionnaires were then entered and analyzed.

For objective 1, descriptive analyses, including means and standard deviations, were performed to examine students' perceptions regarding English learning through web-based e-learning. For Objective 2, thematic units and interface functions were analyzed using the Kano Model [14]. Using English learning websites as the setting, thematic units or interface functions can be categorized based on the interplay of the student's responses for the thematic unit or interface function when present and when absent into the five following categories:

- Attractive quality attribute: A thematic unit or interface function that gives satisfaction if present, but that produces no dissatisfaction if absent.
- One-dimensional quality attribute: A thematic unit or interface function that is positively and linearly related to student satisfaction – that is, the greater the degree of implementation of the thematic unit or interface function, the greater the level of student satisfaction.

- Must-be quality attribute: A thematic unit or interface function whose absence will result in student dissatisfaction, but whose presence does not significantly contribute to student satisfaction.
- Indifferent quality attribute: A thematic unit or interface function whose presence or absence does not cause any satisfaction or dissatisfaction to students.
- Reverse quality attribute: A thematic unit or interface function whose presence causes student dissatisfaction, and whose absence results in student satisfaction.

Table 1. Kano Evaluation Table

Attribute / Category / Implementation	Attractive	One-dimensional	Must-be	Indifferent	Reverse
Implemented	1	1	2, 3, 4	2, 3, 4	5
Unimplemented	2, 3, 4	5	5	2, 3, 4	1

The thematic units and interface functions were categorized in accordance with the Kano Evaluation Table (Table 1). A quality attribute falls into two categories if the difference between the highest rated attribute and the second highest rated attribute is less than 3%.

For Objective 3, interface functions were analyzed using the I-S Model. Interface functions in need of immediate improvement were determined using the I-S Model. In the I-S Model, the horizontal dimension shows the degree of importance of a particular interface function, and the vertical dimension shows the satisfaction level of the interface function [11]. The order pair (importance scale and satisfaction scale) can then be located on the coordinates. The means of the importance scale and the satisfaction scale can be then used to divide the coordinate into the four following areas: excellent, to be improved, surplus, and care-free.

3 Findings

The results of data analysis of the study are presented in this section. The main strengths and weaknesses of the website under study are presented first. This section also reveals the various quality attributes of thematic units and interface functions derived from the data analyses. In the Kano Model, thematic units or interface functions that fell into the *attractive* category are analyzed first, followed by ones that fell into the *one-dimensional* and *must-be* categories. *Indifferent* quality attributes are reported last. In the I-S Model, interface functions that fell into the *to be improved* area are analyzed first, followed by ones that fell into the *excellent*, *surplus*, and *care-free* categories.

3.1 English Learning Website

The following results were derived from descriptive statistics. Students agreed with the flexibility in time of use of the learning website ($M = 4.42$, $SD = 0.62$). The ability

for repeated practice on learned material provided by the website (M = 4.31, SD = 0.63) was indicated as the second advantage. The convenient easy access to use the website (M = 4.26, SD = 0.67) was indicated as another positive trait.

From a learning standpoint, the overall content of the website was considered practical for English learning (M = 3.76, SD = 0.69) to a certain extent. From a technical standpoint, the general interface design of the website was considered easy to use (M = 3.92, SD = 0.64).

The lowest rated item was that the website's design can lead to improvement in speaking skills (M = 2.43, SD = 1.04). Likewise, the students did not agree that the website's design can lead to improvement in writing skills (M = 2.49, SD = 0.98). In contrast, the students agreed that the website's design can lead to improvement in listening comprehension (M = 3.51, SD = 0.99) and reading comprehension (M = 3.54, SD = 0.97).

3.2 Quality Attributes of Website Content in Kano Model

Categorized data of the website content quality attributes identified by the students are reported in Table 2. Ninety-five (44.60%) students identified Daily Life as an *attractive* quality attribute whereas 89 (41.78%) students identified Recreation as an *attractive* quality attribute. The other three thematic units were indentified as *indifferent* quality attributes.

Table 2. Categorization of Website Content Quality Attributes

Unit/ Attribute	Attractive		One-dimensional		Must-be		Indifferent		Reverse		Attribute Category
Daily Life	**95**	**44.60%**	25	11.74%	31	14.55%	62	29.11%	0	0.00%	**Attractive**
Living Environment	62	29.11%	22	10.33%	27	12.68%	102	47.89%	0	0.00%	**Indifferent**
Transportation	43	20.19%	45	21.13%	19	8.92%	106	49.77%	0	0.00%	**Indifferent**
Recreation	**89**	**41.78%**	49	23.00%	20	9.39%	55	25.82%	0	0.00%	**Attractive**
Holidays and Festivals	54	25.35%	27	12.68%	21	9.86%	111	52.11%	0	0.00%	**Indifferent**

3.3 Quality Attributes of Interface Functions

Categorized data of the website interface function attributes identified by the students are reported in Table 3. Of the eight interface functions, Related Phrases was found to be the most *attractive* quality attribute by 102 (47.89%) students. Pronunciation was identified as an *attractive* quality attribute by 75 (35.51%) students. Additionally, Dialogue Practice was identified as *attractive* by 84 (39.44%) students and as *indifferent* by 78 (36.62%) students.

There was only one interface function, Vocabulary, that 73 (34.27%) the students identified as a *one-dimensional* quality attribute. The remaining four interface functions were indentified as *indifferent* quality attributes.

Table 3. Categorization of Interface Function Attributes in Kano Model

Function/ Attribute	Attractive		One-dimensional		Must-be		Indifferent		Reverse		Attribute Category
Vocabulary	43	20.19%	**73**	**34.27%**	46	21.60%	51	23.94%	0	0.00%	**One-dimensional**
Pictures	48	22.54%	41	19.25%	17	7.98%	107	50.23%	0	0.00%	**Indifferent**
Pronunciation	**75**	**35.21%**	35	16.43%	44	20.66%	59	27.70%	0	0.00%	**Attractive**
Related Phrases	**102**	**47.89%**	28	13.15%	21	9.86%	62	29.11%	0	0.00%	**Attractive**
Dialogue Practice	**84**	**39.44%**	29	13.62%	22	10.33%	**78**	**36.62%**	0	0.00%	**Attractive/ Indifferent**
Slang	51	23.94%	30	14.08%	18	8.45%	114	53.52%	0	0.00%	**Indifferent**
Idioms	36	16.90%	22	10.33%	29	13.62%	125	58.69%	1	0.47%	**Indifferent**
Test	25	11.74%	16	7.51%	39	18.31%	131	61.50%	2	0.94%	**Indifferent**

3.4 Importance Level and Satisfaction Level of the Interface Functions

Categorization results derived from the I-S Model are presented in Figure 1. The mean degree of importance for the eight interface functions was 3.99. The mean satisfaction level was 3.45. The mean degree of importance is used as the horizontal axis. In addition, the mean satisfaction level is used as the vertical axis. The two axes divide the coordinate into four quadrants.

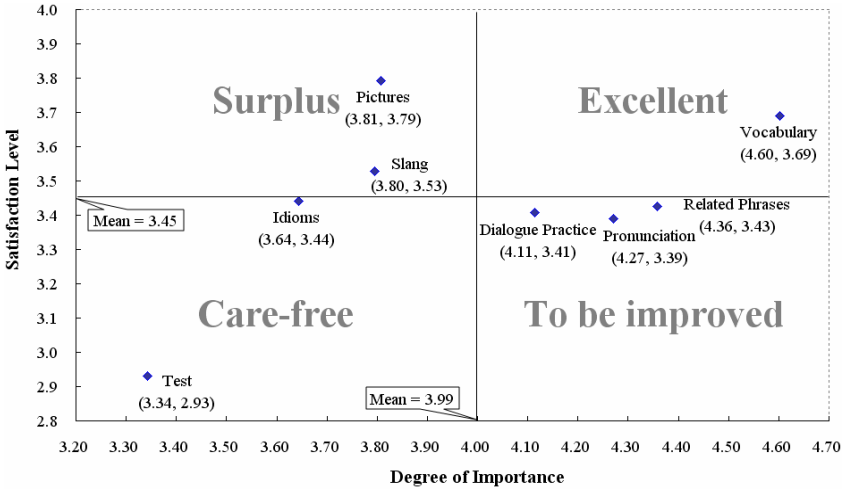

Fig. 1. Categorization of Interface Function Attributes in the I-S Model

The results indicate that there are three interface functions located in the *to be improved* area. Based on the ranking of importance, they are related phrases, pronunciation, and dialogue practice. Vocabulary is the only function in the *excellent* area. Pictures and slang are in the *surplus* area. The remaining two functions, idioms and test, are in the *care-free* area.

4 Discussion

Students have positive perceptions toward the flexibility, repeated practice, and convenient easy access offered by the English learning website. The overall content of the English learning website was found to be of practical use. Students perceived daily life as the most *attractive* thematic area to learn using the website. Since the students have to deal with academic and technical English in the classroom setting, they seem to be more inclined to acquire everyday English in their own virtual learning environment. The general interface design was deemed satisfactory. Still, its limited usefulness for users to practice output skills of speaking and writing was pointed out as a major weakness. Designers of English learning websites should focus on this technical limitation and improve it in order to meet current user needs.

Dialogue Practice received polarized responses. While it was identified as the second most *attractive* user interface function, it was also identified as *indifferent* by approximately one-third of the students. What's more, it fell into the *to be improved* area with relatively low ratings. Likewise, Related Phrases and Pronunciation were also identified as *attractive* functions that fell into the *to be improved* area. These three desirable yet underperforming functions can affect users' development of oral communication competency. The current limitation of the technology to effectively help students practice speaking skills calls for the need to improve the interactive content of the website. Within the past decade, several large-scale language proficiency tests worldwide started to implement mandatory speaking test tasks to comprehensively assess four skills [15, 16]. In increasingly more non-English speaking countries, certain proficiency tests have been imposed on millions of university students as one of their degree requirements [17, 18]. Considering the aforesaid issues and the importance of adequate speaking skills to produce accurate communication, there is an apparent need to tackle the technology's current inability to functionally develop speaking skills. After all, as important as vocabulary is in the acquisition of a foreign language, speaking is as crucial to effective communication.

The Test function was found to be the most *indifferent*, unimportant, and unsatisfied function by a great majority of the students. This finding reflects Kartal's [19] claim that most language learning websites do not utilize the Internet to its full potential, and the pedagogical scenarios and learning theories are reduced to just answering structural exercises such as multiple choice questions, true or false items, and fill in the blanks. Moreover, the proficiency levels, the learning objectives, and the target user group are not clearly specified in these websites. The Test function of the website under study contains only 10 vocabulary matching questions per lesson. The overly simplistic structure may be seen as a cause of the negative user feedback. For online tests to reflect the range of language skills the website intends to offer, they should be designed to measure more than vocabulary acquisition. However, it has been advocated that Internet-based language tests should employ simplified interfaces if students are to be tested in their knowledge of the target language as opposed to being tested on their performance and skills as computer users [20]. To strike a desirable balance, a variety of tests should be developed to assess different language skills while retaining user-friendliness.

Due to the nature of the Kano Model and I-S Model, all data of this study were limited to Likert-type responses. Subsequent studies should include relevant open-ended questions to gather additional data. Interviews should also be conducted to elicit information regarding the preferred improvement that users would like to see.

5 Conclusions

The present study successfully utilized the Kano Model and the I-S Model to assess quality attributes of an online English learning website. Findings of the study led to the conclusion that the content and user interface features of English learning websites should be specially developed according to the satisfaction level of the learners and also the degree of importance perceived by them. On the basis of the attractive attributes identified by the students, instructors can make appropriate changes to the lessons they assign to the students. This will likely increase student motivation as they would be learning what they consider attractive. Degree of importance and satisfaction level of the users can also update website designers with significant information regarding particular interface functions that require immediate improvements. It is recommended that the integrated approach (Figure 2.) developed in this study can be used to enhance the quality of the content and specific user interface functions of English learning websites.

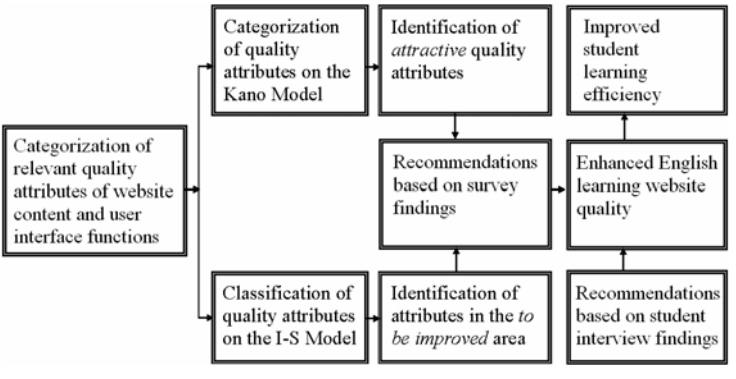

Fig. 2. The Model of Enhancing English Learning Website Quality Using Integrated Quality Assessment

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