Satisfaction of Classroom Teaching of Marketing Based on Fuzzy Comprehensive Evaluation

Yanlin Su
School of Economics and Management, Yanshan University, Qinhuangdao066000, Hebei, China

Abstract
The quality of classroom teaching is the core of teaching, and the quality of teaching can be measured by the satisfaction of teaching from the perspective of students. Marketing is a discipline with strong practicality, and the main goal of marketing teaching is to train the applied talents needed by the market. This paper studies how to evaluate the satisfaction of classroom teaching of marketing, designs the evaluation indicator of teaching satisfaction from four aspects: teaching content, teaching attitude, teaching method and teaching effect, evaluates the satisfaction of marketing teaching with the method of fuzzy comprehensive evaluation, carries out the strategic thinking for how to improve the satisfaction of marketing classroom teaching, and puts forward some suggestions to improve the teaching process.

Keywords: Marketing, Teaching Satisfaction, Fuzzy Comprehensive Evaluation, Evaluation Indicator, Indicator System

1. INTRODUCTION
The quality of classroom teaching is the core of teaching, the quality of teaching can be measured from the perspective of students with the satisfaction of teaching. Marketing is a very practical subject, applied talents required by the market is the main target of marketing teaching, this paper on how to evaluate the marketing of teaching satisfaction, and strategic thinking on how to improve the satisfaction of teaching for marketing.

At present, domestic scholars have some research results on teaching satisfaction. The scholars from the perspective of different teaching satisfaction evaluation model (Liu, 2009; Li, 2009), teaching satisfaction factors influence (Xiong, 2013), as a research method, using the analytic hierarchy process (Xin, 2012), factor analysis (Sa, 2010), structural equation model (Ma, 2012) method. In the above literature, not for the marketing of the course evaluation of teaching satisfaction index, in the design of targeted is not strong; in addition, the research method, mostly factor analysis or structural equation using the statistical analysis method, but the recovery was evaluated by the index table Likert, fuzziness to some extent, so this research adopts fuzzy comprehensive evaluation method to evaluate teaching satisfaction.

2. METHODS AND PROCESS
Fuzzy comprehensive evaluation method is for those who can not be directly quantified based on fuzzy qualitative indicators and quantitative evaluation by using fuzzy mathematics, based on the evaluation of the fuzzy evaluation information evaluation index system of end index, using the fuzzy mathematic method for comprehensive evaluation information from the forward step by step, until you get to the membership representation of the evaluation result. According to determining the degree of membership was rated grade object. This method can comprehensively summarize the opinions of the evaluation subjects, and comprehensively reflect the degree of the pros and cons of the respondents.

2.1. Construction of Evaluation Index System of Classroom Teaching Satisfaction
In this paper based on literature retrieval satisfaction, combined with existing research results, interviews with the group of experts, the research objective is divided into measurement operable, the satisfaction of teaching evaluation system is divided into four aspects: teaching content, teaching attitude, teaching method and teaching effect evaluation index system of classroom satisfaction by the 3 levels of the project: the target layer, criterion layer and index layer. See Table 1 for details.

2.2. Fuzzy Comprehensive Evaluation of Classroom Teaching Satisfaction
In many evaluation indicators, the importance of various indicators affecting classroom teaching satisfaction is different. Therefore, through the weight distribution, we can highlight the main factors, so that the evaluation of teaching satisfaction is more objective.

The first level evaluation index weight set is set, and it has 4 first level evaluation indexes (4 dimensions)
\[ A = (a_1, a_2, a_3, a_4) \] (1)

In the formula, \( \sum_i^n a_i = 1 \), \( \alpha=2 \), \( A \) are weight sets, also called weight fuzzy vector; \( a_i \) is the weight of the first \( i \) level index.

Similarly, the weight sets of the two level indexes are \( W_1 \), \( W_2 \), \( W_3 \), \( W_4 \), respectively:

\[ W_1 = (w_1, w_2, w_3) \] (2)
\[ W_2 = (w_4, w_5, w_6, w_7) \] (3)
\[ W_3 = (w_8, w_9, w_{10}, w_{11}, w_{12}, w_{13}, w_{14}, w_{15}) \] (4)
\[ W_4 = (w_{16}, w_{17}, w_{18}) \] (5)

\[ \sum_{i=1}^3 w_j = \sum_{i=4}^7 w_j = \sum_{i=8}^{14} w_j = \sum_{i=16}^{18} w_j = 1 \] (6)

### 2.3. Index Weight Determination

Because the weight value is very important, the analytic hierarchy process is used to determine the weight of the index. According to the established satisfaction evaluation index system, the expert evaluation table of the importance of evaluation index is made, and the judgment matrix is formed on the basis of expert opinions. The judgment matrix is obtained by comparing the evaluation factors with 22, and the weight of each index is calculated by analytic hierarchy process, and finally the total ranking weight is formed. The specific weight calculation results are as follows:

\[ W_1 = (0.075, 0.075, 0.1) \]
\[ W_2 = (0.0625, 0.0625, 0.0625, 0.0625) \]
\[ W_3 = (0.0375, 0.025, 0.0375, 0.025, 0.0375, 0.025, 0.0375, 0.0375) \]
\[ W_4 = (0.075, 0.075, 0.1) \]

<table>
<thead>
<tr>
<th>Target layer</th>
<th>Restriction layer</th>
<th>weight</th>
<th>Index layer</th>
<th>weight</th>
<th>Total weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Satisfaction of Marketing</td>
<td>Teaching Content</td>
<td>0.25</td>
<td>Teaching freely and freely, full of enthusiasm, passion, familiar with the teaching content.</td>
<td>0.3</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clear thinking, good content before and after the connection, focusing on the core content of knowledge and logical relations explained clearly.</td>
<td>0.3</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Teaching content linked to reality, can reflect the latest developments in disciplines, appropriate examples to help students deepen the understanding of knowledge.</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>Teaching Attitude</td>
<td></td>
<td>0.25</td>
<td>Class on time, not random classes, not ahead of class.</td>
<td>0.25</td>
<td>0.0625</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Teaching, teachers, dress and manners.</td>
<td>0.25</td>
<td>0.0625</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Serious teaching, rigorous attitude.</td>
<td>0.25</td>
<td>0.0625</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The results and test results are timely and fair.</td>
<td>0.25</td>
<td>0.0625</td>
</tr>
<tr>
<td>Teaching Method</td>
<td></td>
<td>0.25</td>
<td>The results and test results are timely and fair.</td>
<td>0.15</td>
<td>0.0375</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Order of classroom organization in case teaching</td>
<td>0.1</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Is the proportion of cases reasonable?</td>
<td>0.1</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quality of selected cases</td>
<td>0.15</td>
<td>0.0375</td>
</tr>
<tr>
<td>Representativeness of selected cases</td>
<td>0.1</td>
<td>0.025</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elicitation of cases</td>
<td>0.1</td>
<td>0.025</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>While ensuring the completion of teaching tasks, but also give students full participation opportunities.</td>
<td>0.15</td>
<td>0.0375</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay attention to the cultivation of thinking methods and innovative awareness, teachers can encourage students to ask questions and personal views and discuss.</td>
<td>0.15</td>
<td>0.0375</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Effect</td>
<td>0.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The attendance rate is very high. Students seldom arrive late, leave early or leave school. Students seldom play mobile phones in class.</td>
<td>0.3</td>
<td>0.075</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The students actively think and speak in class, and the interaction between teachers and students is good.</td>
<td>0.3</td>
<td>0.075</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through the study of this course, related ability has improved, have greater harvest.</td>
<td>0.4</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3.4. Set up Evaluation Set

Set the evaluation set to 1, then \( V = \{ u_1, u_2, \ldots, u_i \} \). \( u_i \) is the i centralized evaluation level in the evaluation system, \( i = 1,2,3,4,5 \). The quality grade of each evaluation index is determined by five comments: "very satisfied, satisfied, satisfied, unsatisfied and unsatisfied". Therefore, the evaluation set should be "the quality grade". In order to facilitate comparison, can further qualitative evaluation in quantitative analysis, were "very satisfied, satisfied, satisfied, less satisfied, dissatisfied with the assignment, then makes the quantitative evaluation set \( V = \{ 95, 90, 85, 80, 70 \} \). 

### 3.5. Construction of Fuzzy Evaluation Matrix

According to the survey of students satisfaction score questionnaire, ratio of each index \( U_{ij} \) belonging to \( V \) the number of comments and participate in the survey of the total number, such as the fuzzy evaluation matrix for \( U_j \):

\[
R_i = \begin{bmatrix}
    r_{i1} & r_{i2} & \cdots & r_{ij} \\
    r_{i1} & r_{i2} & \cdots & r_{ij} \\
    \vdots & \vdots & \ddots & \vdots \\
    r_{i1} & r_{i2} & \cdots & r_{ij}
\end{bmatrix}
\]

(7)

According to table 1, the satisfaction evaluation index set U contains 5 indicators, namely \( U = (U_i)(i=1,2,3,4,5) \). The evaluation set \( V = (v_1,v_2,v_3,v_4,v_5) = (\text{Very satisfied, Relatively satisfied, Satisfied, Less satisfied, Dissatisfied}) \), the evaluation matrix \( R = (r_{ij}) \), the weight set \( W = (w_{ij}) \), gets the result that the index \( U_{ij} \) belongs to the evaluation set \( V \). The fuzzy comprehensive evaluation model is used to obtain the evaluation matrix of the satisfaction of the control layer:

\[
R_1 = \begin{bmatrix}
    0 & 0 & 0.02 & 0.06 & 0.92 \\
    0 & 0 & 0.03 & 0.15 & 0.82 \\
    0 & 0 & 0.02 & 0.12 & 0.86
\end{bmatrix}
\]

\[
R_2 = \begin{bmatrix}
    0 & 0 & 0 & 0.09 & 0.91 \\
    0 & 0 & 0 & 0.17 & 0.83 \\
    0 & 0 & 0.02 & 0.12 & 0.86 \\
    0 & 0 & 0.09 & 0.46 & 0.45
\end{bmatrix}
\]
The two level evaluation matrix only reflects the influence degree of a grade two level evaluation index of each evaluation object, not to consider the importance of each evaluation index. Only by introducing the weight of each evaluation index can the comprehensive effect of all the evaluation indexes be reasonably reflected.

Therefore, the two level evaluation results need to be synthesized by the fuzzy transformation in the form as follows:

\[
R_i = \begin{bmatrix}
0 & 0 & 0.02 & 0.18 & 0.80 \\
0 & 0 & 0.07 & 0.33 & 0.60 \\
0 & 0 & 0.07 & 0.31 & 0.61 \\
0 & 0 & 0.02 & 0.29 & 0.69 \\
0 & 0 & 0.03 & 0.27 & 0.70 \\
0 & 0 & 0.05 & 0.29 & 0.66 \\
0 & 0 & 0.04 & 0.22 & 0.74 \\
0 & 0 & 0.05 & 0.28 & 0.67 \\
\end{bmatrix}
\]

\[
R_6 = \begin{bmatrix}
0 & 0 & 0.08 & 0.39 & 0.53 \\
0 & 0 & 0.09 & 0.34 & 0.57 \\
0 & 0 & 0.03 & 0.17 & 0.80 \\
\end{bmatrix}
\]

In the formula, \( B_i \) is the evaluation result matrix of the first \( i \) grade evaluation index; \( b_{ij} \) is the degree of the first \( i \) evaluation index belonging to the \( j \) evaluation level.

There are many methods for the synthesis of (4)-(7) methods. Here we use the following synthesis algorithm:

\[
B_1 = W_1 \times R_1 = (b_{11}, b_{12}, b_{13}, b_{14}, b_{15})
\]

(8)

\[
B_2 = W_2 \times R_2 = (b_{21}, b_{22}, b_{23}, b_{24}, b_{25})
\]

(9)

\[
B_3 = W_3 \times R_3 = (b_{31}, b_{32}, b_{33}, b_{34}, b_{35})
\]

(10)

\[
B_4 = W_4 \times R_4 = (b_{41}, b_{42}, b_{43}, b_{44}, b_{45})
\]

(11)

In the formula, \( B_i \) is the evaluation result matrix of the first \( i \) grade evaluation index; \( b_{ij} \) is the degree of the first \( i \) evaluation index belonging to the \( j \) evaluation level.

Form (8)-(11): \( \wedge \) means two variables take small operations; \( \lor \) represents two variables to take large operations. Finally, the \( B_i \) is normalized

\[
b_{ij} = \frac{b_{ij}}{\sum_{j=1}^{5} b_{ij}}, i = 1, 2, 3, 4
\]

(16)

The fuzzy evaluation of each evaluation layer is carried out, and the evaluation values of teaching content, teaching attitude, teaching method and teaching effect satisfaction degree are obtained respectively. Specific as follows:
In the same way, draw $B_2, B_3, B_4$, as follows:

$$B_2 = (0 \ 0 \ 0.027 \ 0.207 \ 0.765)$$

$$B_3 = (0 \ 0 \ 0.041 \ 0.266 \ 0.693)$$

$$B_4 = (0 \ 0 \ 0.062 \ 0.286 \ 0.652)$$

In the same way, the first grade evaluation index weight is multiplied with the two grade evaluation result matrix, and the first grade evaluation result matrix is obtained immediately:

$$U = A \cdot (B_1, B_2, B_3, B_4)^T = (u_1, u_2, u_3, u_4, u_5)$$

(17)

Medium: $u_1, u_2, u_3, u_4, u_5$ means teaching satisfaction is subordinate to "Very satisfied, Relatively satisfied, Satisfied, Less satisfied, Dissatisfied" five rating levels. The synthesized algorithm is still used to synthesize and synthesize the results, and then normalize the result matrix. It is concluded that the fuzzy comprehensive evaluation method can be used to get the final evaluation set of fuzzy comprehensive evaluation of students' teaching satisfaction

$$U = W \cdot B$$

(18)

$U$ value is $U=(0 \ 0 \ 0.038 \ 0.217 \ 0.745)$.

The final evaluation set is removed by fuzzy calculation, and the comprehensive evaluation of student satisfaction is obtained

$$P = U \cdot V^T$$

(19)

$P$ value is $P=(0 \ 0 \ 0.038 \ 0.217 \ 0.745) = 72.74$

According to the numerical value, we can judge the satisfaction degree of students to the satisfaction level of classroom teaching.

4. CONCLUSIONS

A comprehensive evaluation using fuzzy comprehensive evaluation method of classroom teaching of marketing satisfaction analysis, the final score was 72.74, indicating that students are satisfied with the teaching of marketing. From the evaluation results, some details of the teaching still have space to improve. Practical marketing teaching should strengthen the teaching content, teachers should focus on teaching skills in the teaching process to cultivate students' comprehensive ability, training students' creative thinking ability.

REFERENCES


