

# Online Teaching Assessment of Planning and Design Courses Based on Students' Evaluation of Teaching Effectiveness

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**Abstract:** With the diversity of teaching model development, most universities across China have started to adopt online teaching to the courses. Faced with the fact that there is no mature theory on teaching planning and design courses on online. This study based on the existing theoretical research on online teaching, constructs an online teaching effectiveness evaluation framework conforming to planning and design courses in conjunction with landscape architecture majors, evaluates each index by learning experience participants through hierarchical analysis. We explores the importance of each evaluation index, and provides some reference for Planning and design majors to carry out online.

**Keywords:** Hierarchical analysis; Student evaluation; Planning and design courses; Online teaching

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## 1. Research background

In context of the Internet era, technology and technological innovation are undergoing profound changes in every field of society. Personnel engaged in higher education management and teaching need to learn to effectively use Internet to organically combine modern education technology with traditional education and teaching methods<sup>[1]</sup>.

As students are subject of teaching, learning evaluation is one of the important contents of mixed teaching. However, there are few research results on learning evaluation at present, and no mature theoretical system has been formed<sup>[2]</sup>. Although online education is well established in academia, the effectiveness of course design and student participation remains uncertain<sup>[3]</sup>. Student participation has always been an important topic in higher education, because it has a positive impact on students' persistence and retention, including not only how teachers attract students, but also students' behavior in teaching activities. Due to the lack of face-to-face contact and contact between teachers and students in online courses, students will assume more learning responsibilities. Therefore, it is of great significance for improving teaching quality and teaching evaluation results to decompose the influence degree of non-teacher factors on students' teaching evaluation results.

Knowing the real needs of students and accurately pushing teaching resources can improve the learning efficiency of students in process of online learning. This study takes the planning courses of online teaching as object of teaching evaluation. This study tries to find a feasible method to make a comparative analysis of online and offline course evaluation by constructing a research framework for the course evaluation.

## 2. Research method

### 2.1 Construction of hierarchical analysis

American operations research scientist Saaty put forward analytic hierarchy process in 1970s. Through the combination of quantitative and qualitative analysis, influence factors were compared in pairs to determine the importance. SIRII(Students Instructional Reports) is a teaching evaluation index system developed by American educational testing Center. This study takes the revised SIRII as the research basic framework, and divides five parts of e-learning platform, e-learning course, e-learning guidance and support, e-teaching management and quality assurance system into 29 items. Based on

**Table 1** Weight of importance index of teaching evaluation of

Criterion layer	The weight	The weight	Normalized weight
B1 Course organization and planning	C1 Objectives of the Course	0.2475	0.0321
	C2 Course design form	0.2606	0.0338
	C3 The study of theoretical knowledge	0.2274	0.0295
	C4 The learning of practical knowledge	0.2621	0.034
B2 Classroom communication	C5 Teachers explain the clarity of the theory	0.1803	0.0221
	C6 Teachers explain the clarity of the training	0.1933	0.0237
	C7 The teacher's enthusiasm for teaching	0.177	0.0217
	C8 The way teachers deal with important issues	0.2382	0.0292
	C9 Explanation of case study	0.2008	0.0256
B3 Learning environment	C10 Suitable environment for theoretical study	0.2996	0.0361
	C11 Suitable environment for training	0.2407	0.029
	C12 learning environment	0.2465	0.0297
	C13 Facilitate communication while group work	0.2124	0.0256
B4 Course harvest	C14 Increasing knowledge in this class	0.167	0.0258
	C15 Making progress in reaching goals	0.1611	0.0245
	C16 Enhance interest in the study of this subject	0.1571	0.0239
	C17 Think independently about subject matter	0.1795	0.0273
	C18 more active in learning relevant knowledge	0.1492	0.0227
	C19 Higher learning efficiency	0.1861	0.0283
B5 Teacher-student interaction	C20 Interaction with teachers in theory class	0.224	0.0254
	C21 Interaction with teachers in training class	0.2266	0.0257
	C22 After-class communication	0.1781	0.0202
	C23 Homework review is more effective	0.1896	0.0215
	C24 Extra-curricular help is more effective	0.1737	0.0197
B6 Homework tests and grades	C25 Higher quality of course work	0.3062	0.0433
	C26 completion requirements are clearer	0.2454	0.0347
	C27 Assignments have more coverage of points	0.1987	0.0281
	C28 Comments on homework is more effective	0.2588	0.0366
B7 Effort and investment	C29 Put more effort into the class	0.2978	0.0656
	C30 Feel the challenge of the course	0.2256	0.0497
	C31 Self-discipline in theory class	0.2238	0.0493
	C32 Self-discipline in training class	0.2524	0.0556

previous studies on network teaching and student teaching evaluation, criterion level in analytic hierarchy framework is divided into 7 aspects, including course organization and planning and design, classroom communication, learning environment, curriculum harvest, teacher-student interaction, homework examination and grade evaluation, effort and investment, and 23 program levels. In combination with characteristics of planning and design and design majors, the final revised indicators total 32.

## 2.2 Computation of analytic hierarchy

Considering error influence of different classes and teachers on experiment, 37 students who participated in online course in this semester participated in the evaluation of questionnaire. A total of 33 evaluation forms were collected, and students rated importance of these 7 criteria layers and the item scheme layer under each criterion layer.

In this experiment, A is taken as target layer, and each criterion layer  $B_1, \dots, B_n$  below it is assigned A weight of 1-9 according to their relative importance to A. According to needs of this research, we use sum product method to calculate the weight value of learning performance evaluation. There is A judgment matrix B for the n criterion layers  $B_1, \dots, B_n$  under target layer A, then the main steps to find the eigenvector  $\omega = (\omega_1, \omega_2, \dots, \omega_n)^T$  and the maximum eigenvalue  $\lambda_{max}$  are as follows:

The elements in judgment matrix A are normalized:

$$B_{ij} = \frac{b_{ij}}{\sum_{i=1}^n b_{ij}} \quad (1)$$

Finnding the maximum eigenvalue:

$$\lambda_{max} = \frac{1}{n} \sum_{i=1}^n \frac{(B\omega)_i}{\omega_i} \quad (i, j = 1, 2, \dots, n) \quad (2)$$

Through calculation, we can get the weight value of each index of learning evaluation.

## 2.3 Results of calculation

Excel software and SPSS20.0 were used to calculate the weight and consistency test of 33 evaluation forms. The results showed that 30 evaluation forms passed consistency test, with a passing rate of 90.9%. The weight of income is shown in Table 1.

## 3. Results of Study

In terms of ranking results of criterion layer, students think effort and input are the most important. Since online courses cannot be taught face to face, students believe that their efforts and input are the most important. Interaction with teachers and other factors were rated as the least important. To cope with the online teaching mode, we need to improve from following three aspects:

### 3.1 Improve students' self-efficacy and independent learning ability

In the online teaching, students think that their own effort and input (0.2203) is the most important among the criterion layer, and normalized weight of four indicators layer is also the highest, and the weight of the learning environment of the theoretical course (0.0361) also reflects the importance of independent learning. In the process of online teaching, curriculum design should provide students with independent supportive learning environment as an important teaching approach, meanwhile, improve students' sense of self-efficacy in learning, and mobilize students' enthusiasm for independent learning by appropriately increasing proportion of independent learning teaching arrangement.

### 3.2 To strengthen the teaching methods of dealing with important and difficult problems

The research results show that the content weight of high quality of homework completion (0.0433), effective homework comments (0.0366), clear homework requirements (0.0347), etc. is second only to the effort and input of courses. However, the way teachers deal with important issues (0.0292) is relatively important in the overall evaluation. It can be seen that although there is some difficulty in communication in network teaching, teachers should make use of diversified network resources and teaching means to make corresponding adjustments in the teaching of difficult points.

### 3.3 Improve the teaching quality of practical training courses

The research results show that because theoretical courses are more passive in receiving knowledge and have higher requirements for learning environment, practical training courses are more important than theoretical courses. In fact, due to the inability of face-to-face communication between teachers and students, practical training homework review has certain obstacles. According to interview, students think that the most effective way to communicate online homework is to use online conference, followed by text communication, and the worst is email.

At present, only preliminary research has been carried out on the evaluation methods of e-learning performance. Due to certain randomness and fuzziness in the evaluation work with students as evaluators, the conclusions of this study may not be absolutely representative. It is difficult to carry out the full coverage of online teaching performance evaluation. It is hoped that more disciplinary researchers can carry out research on students' online learning performance evaluation, so as to make the evaluation process more perfect.

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