



Art Design Specialty Evaluation Based on Analytic Hierarchy Process Theory

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ABSTRACT

The evaluation and improvement of the quality of Art design education in higher education is an important issue of on-going concern. The analytic hierarchy process theory based on statistics can systemize and modularize evaluation frame and also quantize teaching efficiency scientifically, clearing the teaching purpose, in order to provide the reference basis for standardizing the teaching management of the design specialty.

Keywords: Art design; performance evaluation; analytic hierarchy process

INTRODUCTION

As for the evaluation of teaching efficiency, the most intuitionist method is the identification to the final examination achievement. Course grading as one of the method which we are familiar with integrating the degrees, standard answers will determine the levels of mark. In fact, most of the paper test has standard answers and the answer is incontrovertible and exclusive, so we would improve the justice of examination and ordered teaching. Having a standard answers for exam is very popular in the major of science and engineering school and students are willing to accept it. However, there are many students majoring in art and literature which have different cognitions on evaluation standard of the course achievement. This discrepancy not only exists in colleges, but also in the same design work in the eyes of two teachers of the same college. Here are two PSAS (public service ads) of two students, conceiving from two aspects to the theme of "Caring the Old". And we can hardly pass judgment on the two PSAS and tell which one is much better. The reason why there is objection on the achievements evaluation of art design specialty is that the cognition of purpose and point cut of course test is diverse to teachers, and also you can't ignore the factors such as knowledge background, experience and personal preference and so on. All these factors results in the discrepancy. As a man work in art design education or working for design, maybe you can understand such phenomenon. However, the art design education can't accept such completely unscientific evaluation method just because of "understanding". The evaluation method leading by teachers' subjective consciousness has a series of problems. Firstly, it counts against students' sense of innovation. Some students will pay attention to teachers' designing preference of relative courses, reckon the preference of teachers and not emphasize the teaching purpose of courses, so it restrains their desire of design innovation for the courses' evaluation standard is up to the teachers' subjectivity. Secondly, it is bad for the establishment of right design conception. Teachers' subjective consciousness has some uncertainty on its own, so there is a possibility that the test standard is different from today to tomorrow, from last week to this week, which makes students have no notion for course homework on how to fit for teachers' requirements. This phenomenon will bruise the students' creative passion, so it counts against the establishment of the scientific design conception.

All these courses of the design teaching system will be examined by teachers and finally forms the achievements. The students' achievement is the direct presentation of the level of mastering courses examination, at the same time; it is the self-judgment for checking the teachers' teaching achievements, as well as the significant reference for schools to evaluating the teaching quality. Even if in the condition that teacher is objective and judicial, the

achievement has apparent divergence because of the uncertainty due to mood, environment, and evaluation methods and so on. To some extent, it indicates that the evaluation system loses key evaluation factor. Besides subjective factor of teachers, on the other hand, we find that outstanding students always perform innovation ability of high art design in professional courses, which shows that there is strong similarity in the same specialty fields in aspects such as course frame, training purpose, and evaluation method, and they have similar evaluation factor frame and weight proportion relationship. Thus, we can classify the professional courses of art design specialty according to the system structure. In a sense, it projects professional courses in light of teaching process, but it does not set teaching purpose systematically. Because of quantification of the final marks, we extract relative evaluation factors of courses in the system of professional teaching, so the weight proportion dividing the evaluation factor forms the important quantitative features that test learning effect and teaching quality, which forms the quantitative courses evaluation index system. The detailed method can use the courses relative factors or system frame of cluster analysis improving courses and relative weight proportion to analyze, and use multivariable linear regression theory to realize quantitative evaluation index combining the courses evaluation's quantity with qualitative diagnosis.

THE FRAME RESEARCH OF ART DESIGN SPECIALTY TEACHING EVALUATION FACTOR

To test the establishment of evaluation factor and the set of weight proportion is reasonable or not, we must set them in art design education system to establish, and examine as well as correct them in practice. The purpose of establishing the evaluation system is not only checking and evaluating students' courses homework, furthermore, to examine as well as correct the students' learning process. In this way, it will make students lay stress on the final visual effect. the most important is that they can pay attention to inner logicity and rationality of design and clear the connotation and culture of art design. On the other hand, the evaluation to students' learning process can make teachers focus on students' learning ability, get to know students' design ability, and think about students' character factor. Based on this, we can divide the evaluation system into two parts as a whole, namely the process evaluation of art design and effect evaluation of art design.

If we compare the process evaluation of art education and final effect evaluation, the former has stronger effectiveness and accuracy. It can focus on the students' learning trends in the whole process at the beginning of courses, which presents dynamic relationship between students and teachers as well as students and courses design in courses teaching. In this process, the main evaluative factors are as follows: first is the learning attitude of students; second is the inner logicity and relevance of the students' innovative mind in the process of courses projection.

In the process of students' class teaching, because the learning attitude of students has no relationship with the IQ, EQ and such individual attributes, the creed of "Attitude Decides Everything" can serve one of the evaluation standards. Seeing from the surface, whether the learning attitude is proper or not is the individual performance of students, however, if most students learn knowledge actively and earnestly, then the good class learning atmosphere is formed. The check and evaluation of students' learning attitude can identify from the following aspects. First is the attending condition. Students should not be late for class, early leaving, or absent for class of no reason. Second is the class performance. Students should obey the classroom discipline, interact actively with teachers as well as students in the process of subject projection and create a impassioned class atmosphere. Third is the homework. Students should finish homework which is arranged by teachers on time and adjust homework in time in light of the revised suggestion teachers give.

Usually, the teaching of art design specialty courses takes the form of topic projection leading-in, moving forward orderly from the establishment of the first scheme to the revise of the projection scheme. The test for the inner logicity and relevance of students' innovation mind in the courses projecting process mainly pays attention to process of students' creative mind, at the same time, it is a reasonable judgment on students' projecting process and method. The design is a process that the creative mind has out a release and inner convergence, divergence as well as gathering, so we can imagine it with a fancy pie-in-the-sky, however, the process of mind creation has inner relevance and logicity. The proper design mind method will lay a solid foundation on students' later career. On the other hand, the test of the inner design relevance and logicity can make teachers find projection plagiarism and prevent from plagiarizing others' projection work, thus create an equal, ordered, and active teaching atmosphere.

Though the process evaluation of projection art specialty courses is very important, the final teaching effectiveness is the main accordance to evaluate the degree that students master the courses professional knowledge. It reflects on in the following three aspects: the normative degree of the final projection homework, the modal beauty, and innovative degree of projection.

Every art design specialty course will make some requirements to the homework using certain form standard, which indicates strictness and rationality of modern art design teaching and has the same steps with perceptual as well as

imaginative art design activities. The test of projection homework's formal degree mainly examines the implementation that students finish homework in light of the form given by teachers. The students majoring in art have free characters. Usually they focus on shape and result of the project, easily ignoring the form and standard which carry the project content. The research of modern projection theory indicates that only the combination of rational standard consciousness and perceptual innovation mind can establish the scientific project management concept, thus can acquire strict work style and long design life.

The formal beauty of projection considers aesthetic experience of project's apparent form as the judgment preference. Definitely, the quality of design work can not solely base on students' or teachers' subjective consciousness, neither do the degree of formal beauty's resonance, or we will go back to the preceding road and lose our way. The detailed art design specialty courses consider design application as premise, requiring that it must combine with societal reality. In such premise, corresponding design specialty courses can easily find the formal beauty standard of a good design. These years the report about the college education and society production is quite normal, which is a warning sign for all of us. There is an essential difference between art design and art. Art design is the applied art. Only it considers the utility, humanity, emotion caring, culture resonance etc. as the valuation basis of formal beauty can it is accepted by the masses.

Innovation is the initial motive power to endlessly moving forward, the life of art design, and the important signpost for weighing a project's value. As a teacher, he/she has many angles to understand the design work of students. However, as for innovation, we consider it in two aspects. The first is whether the design work has innovation, as well as the degree of innovation, which should be emphatically stated in design instruction of students' courses' homework, and it is also the part which needs the teachers to understand thoroughly. Secondly, as for design education, we ought to encourage innovation. Mark is only the number on paper, which does not have vitality. However, we give marks as the encouragement to the students who have the innovation consciousness, which may waken their design vigor, furthermore, it may influence the students who are involved, and thus establish the design concept of design innovation. All in all, we have preliminarily established an evaluation form of art design specialty teaching. As shown on table 1.

Tab.1: preliminary evaluation frame of art design specialty teaching

Evaluation		Process evaluation			Result evaluation	
Factor	learning attitude	inner logistics of the design	form standard	formal	beauty	degree of innovation

EVALUATION INDEX SYSTEM FOR ART DESIGN EDUCATION QUALITY

In such a diverse environment, there are a number of methods that can be applied. In the study outlined in this article, an evaluation index system of Art Design education quality, based on an analytic hierarchy process model, was applied. A novel model is presented in this article for a college evaluation index system for Art design education quality. The proposed model and its evaluation index system would enable art design education quality evaluation.

THE AHP METHOD

The analytic hierarchy process or AHP method, which was established in 1977, is a popular way to solve multiple criteria decision problems. The AHP method provides a comprehensive structure by which to combine both quantitative and qualitative criteria in the decision-making process. Practice has proven that the method is easy, comprehensive and logical. Based on AHP, the factors involved in undergraduate education can be varied and a unified evaluation index system can be created.

In the AHP method, the problem is structured hierarchically in different levels. Any complex problem can be decomposed into several sub-problems using AHP, and hierarchical levels, where each level represents a set of criteria relative to each sub-problem. As AHP is a very powerful method by which to solve complex decision problems, it was selected as the major tool in this study. Next, the simulation methods are described in detail.

The AHP method is based on the use of pair-wise comparisons, which lead to the elaboration of a ratio scale. In the AHP method, multiplicative preference relations are called judgment matrices, and are adopted to express the decision makers' preferences. The pair-wise comparisons constitute square matrices, as shown in the matrix (1), the values of which are between 1/9 and 9.

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix}_{n \times 1}, \quad X = \begin{bmatrix} 1 & x_{11} & x_{12} & \cdots & x_{1m-1} \\ 1 & x_{21} & x_{22} & \cdots & x_{2m-1} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ 1 & x_{n1} & x_{n2} & \cdots & x_{nm-1} \end{bmatrix}_{n \times m} \quad (1)$$

$$\beta = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_{m-1} \end{bmatrix}_{m \times 1}, \quad \varepsilon = \begin{bmatrix} \varepsilon_0 \\ \varepsilon_1 \\ \vdots \\ \varepsilon_n \end{bmatrix}_{n \times 1} \quad (2)$$

As mentioned before, in this study, the AHP method was applied to evaluate the quality of Art Design education. The AHP method searches and evaluates the cause and effect relationship between a goal and alternatives by breaking down the structure of the problem. Finally, the AHP method was used to measure education quality by utilizing the evaluation index system.

PROPOSED EVALUATION INDEX SYSTEM BASED ON THE AHP METHOD

As the pace of market globalization quickens, the number of potential evaluation indices of Art Design education quality assessment increases; and the aim of this study was to develop an evaluation index system of Art Design education quality that would be effective and efficient. A large attribute set has been reduced and transformed into a lesser number of sub-targets to facilitate the evaluation of education quality.

This study introduced the AHP method to establish an integrated evaluation model. The Art Design quality education problem involves analyzing and measuring the performance of a set of candidate indicators.

CASE STUDY OF ART DESIGN EDUCATION QUALITY EVALUATION

During the case study, the AHP method was applied to solve the problem of Art Design education quality evaluation. The staff implemented a physical evaluation in their departments as part of a quality assurance process. It included a total of 17 criteria, divided into five cognate groups covering all the basic aspects of the college course. The evaluation index system of Art Design education quality is shown in Figure 1. The criteria were based on the overall aims and objectives of the physical course.

Tab.1: Evaluation index system and index weights

First class index		Second class index	
Index name	Index weights	Index name	Index weights
A: Talent development	0.285	A ₁ : Course content	0.137
		A ₂ : Course proportion	0.284
		A ₃ : Course construction	0.193
		A ₄ : Textbook compilation	0.386
B: Teaching methods	0.207	B ₁ : Teaching approach	0.364
		B ₂ : Teaching means	0.245
		B ₃ : Teaching technique	0.391
C: Teaching staff	0.116	C ₁ : Construction and training	0.216
		C ₂ : Full-time teacher	0.183
		C ₃ : Scientific research	0.327
		C ₄ : Practical education	0.274

In the study, the AHP method was applied to screen indexes and the weight coefficients were defined. According to the proposed model, the estimation of an evaluation index system of Art Design education quality involves the following phases. First, an investigation was carried out of current Art Design education quality. Second, an analysis was made of the legitimacy of the evaluation index system. Third, the evaluation process was transformed into concrete operational procedures and standards. At the same time, the evaluation indexes to evaluate Art Design education quality were selected. However, when the data are collected, it will be necessary for respondents to determine the complicated network of the state-education relationships.

Thus, it was found that these proposals are not only very effective in helping AHP decision makers to reach consensus, but they also provide convincing alternatives for physical education quality. Based on the findings from

the preceding literature reviews, an AHP model was formulated to evaluate Art Design education quality, as shown in Table 1, the models of AHP were studied, and the AHP algorithm was analyzed. Then, the AHP method was used to determine the weights of the evaluation index system for Art Design education quality. The basic information with respect to index weights is shown in Table 1.

CONCLUSION

In conclusion, using the evaluation method based on analytic hierarchy process theory evaluate achievements of art design specialty courses, on one hand it can standardize art design teaching, making art design teaching more scientific, systematic and strict; on the other hand, it provides a reference for daily teaching. That is to say, students can clearly understand the purpose and distinction of specialty learning. At the same time, it provides referential theoretical reference for teachers' teaching. Moreover, in practical application of specialty achievements' evaluation, the evaluated factor and weight involved by multiple equation can readjust, according to the characters of specialty courses by teachers, optimizing evaluating system, better servicing for the teaching of design specialty courses.

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