



# Research on the Evaluation System of Interior Design Curriculum in Response to Industrial Circles Expectations of Technology Capabilities

Shih-Yuan Liu<sup>(✉)</sup> and Chih-Hua Wang<sup>(✉)</sup>

Department of Interior Design, Asia University, #500, Lioufeng Road, Wufeng, Taichung 41354, Taiwan, ROC

Liusytt@gmail.com, ab324000@ms41.hinet.net

**Abstract.** Globally competitive market environment, interior design students will face a challenging environment after graduation. Therefore, the best strategy of high professional quality manpower requirements is enhancing self-competitiveness and create unique competitive advantages. However, learning achievements of interior design students cultivated by the academia are directly reflected in the expectations of the industrial circles for professional capabilities. There has obviously been a gap that is far less than expected in recent years; secondary the lack of holistic to conduct quantitative investigations on the gap between “school curriculum design” and “professional capabilities required in industrial circles”. At present, the method of qualitative investigation is the majority, and the investigation and research on the current situation of interior designers in the actual industry is obviously not getting attention. Therefore, this research is mainly to exploring the interior design curriculum in response to industrial circles expectations of technology capabilities in Taiwan. The study used the Delphi Method to conduct an expert questionnaire survey. This research found that the importance sequence of the hierarchical categories of curriculum planning and design items for interior design education in higher education are “Interior Planning and Design” (8.57), “Interior Design Practice” (8.05), “Computer Information Technology” (7.78). The research results not only can be used as a reference for future university institutions to adjustment the direction of interior design talent cultivation, but also as an important reference and suggestions for design of multiple innovative curriculums in the future.

**Keywords:** Interior design curriculum · Technology capabilities · Curriculum design · Delphi method · Evaluation system

## 1 Introduction

The field of interior design is quite broad. In a diversified market, it is necessary to appropriately follow the changes of the times and environment, and constantly review interior design talents should have the professional knowledge and skills to meet the needs of the industrial circles [1]. The purpose of university education is to cultivate the

professional talents needed by the industry. Therefore, the professional knowledge and technology taught by the school should be in line with the industry circles [2]. In addition, the school's curriculum design should be based on the concept of customer-centricity. Schools should understand what kind of talents the industry needs and what abilities should they possess? [3] After analysis, the school will know what kind of curriculum should be designed to cultivate students with these abilities. Whether the capabilities of the students cultivated in the academic world after graduation can meet the needs of the industry. In this way, the students who graduate from the school will be the professionals needed by the enterprise [4, 5].

Technological advances had an impact on the field of education, and computer technologies were started to be used mainly in interior design, architecture design and planning departments in colleges [3]. From the perspective of school education, curriculum is what students learn, so the suitability of the course content will directly affect students' employment competitiveness in the future [6]. However, from the perspective of the problems faced by interior design education, the industry's expectations for the completion of the training of interior design professionals, there has obviously been a gap that is far less than expected in recent years. In addition, there is a lack of scientific and quantitative investigation and research on the gap between "school curriculum design" and "professional capabilities required in industrial circles". Therefore, through the research results, it can be understood whether the current interior design curriculum design of university meets the expectations of the industry circles? What professional knowledge and skills should be taught in the interior design curriculum of university to meet the needs of employment in the future? The research results not only can be used as a reference for future university institutions to adjustment the direction of interior design talent cultivation, but also as an important suggestion for design of multiple innovative curriculums in the future.

## 2 Methodology

### 2.1 Delphi Method

In 1948, Rand Corporation developed a problem-solving technology called Delphi Method, which was widely used by government departments and corporate organizations (Dunn, 1994). The Delphi method integrates the opinions of experts to make prediction results. Therefore, it not only has the effect of brainstorming, but also obtains the quality of independent judgment of experts [7]. At present, it is widely accepted by the management and technology circles. In addition to being used in technical progress forecasting, long-term forecasting, and market forecasting, it is also used to forecast bulk material transactions, futures trading volumes, and price changes.

In this study, the statistical judgment indicator of opinion "consistency" was used as the standard for ending the expert questionnaire survey. The "consistency" is observing the Quartile deviation of the expert group's opinions on each item. Use "Quartile deviation" ( $Q_1$ ,  $Q_2$ ,  $Q_3$ ) represents the level rated by 25%, 50%, and 75% for respondent.

**Table 1.** Criterion for the consistency of expert opinions

Degree of consistency	Highly degree	Medium degree	Low degree
Quartile Deviation (Q)	$Q \leq 0.60$	$0.60 < Q \leq 1.00$	$Q > 1.00$

Where  $Q_1$  represents the first quartile, Its  $Q_2$  represents the second quartile, Its  $Q_3$  represents the third quartile, Its  $Q$  represents the Interquartile range. The calculation formulae (1) follow. The criterion is based on the research results of Fahety and Holden [8, 9], as shown in Table 1. Completion of the questionnaire was judged using the consistency test results. If there are more than 85% of the items, and the expert opinions are highly or medium degree consistent, the questionnaire survey is completed.

$$(Q_3 - Q_1) / 2 \quad (1)$$

## 2.2 Research Design Framework

This study is to investigate whether the interior design curriculum planning in higher education can meet the expectations of the industry circles. Therefore, the Delphi questionnaire method is used to collect the expert opinions from industries and scholars. The Delphi questionnaire is compiled based on the literature analysis. It analyses the content of the relevant interior design information about the work items, and summarized the industry's expected ability items. Based on this, the Delphi expert questionnaire was developed as a basis for soliciting opinions from various experts.

The questionnaire lists the relevant course items that interior design talents need to have in knowledge and practical technology, and gives the expert group an evaluation. The importance of each course items in the professional ability that constitutes the current required for industry circles. The importance of each course items in constituting the professional competence currently required by the industry circles, this is the weight and the score of the item. At the same time, it can also obtain the current development status and trend in interior design industry.

## 3 Research Content and Process

### 3.1 Research Content Implementation

The main purpose of the Delphi questionnaire is to obtain the importance of expert groups for school curriculum learning, in order to meet the professional competence required by the industry in future. Therefore, this study developed a Delphi expert questionnaire based on the analysis of domestic and foreign literature. The questionnaire design and operation methods are as follows:

- The first Delphi expert questionnaire adopts the eleventh-grade scale (very important to very unimportant), 0 to 10 points are given in their order.

- For the second Delphi expert questionnaire, the results of the first analysis should be attached, and the respondents should be informed of the results of the first answer.

The number of experts who implemented the Delphi expert questionnaire in this study was thirty-five. Among them, there are twenty-five interior design experts and ten interior design education personnel. After twice Delphi expert questionnaire surveys, the statistical analysis methods used are as follows: after the first Delphi expert questionnaires and second Delphi expert questionnaires were collected, statistical calculations were carried out to calculate the standard deviation, average number, order of importance and consensus opinion of experts for each course items.

- Null Hypothesis: Delphi experts have no unanimous consensus on the importance of curriculum items for interior design education in higher education.
- Alternate Hypothesis: Delphi experts have a consistent consensus on the importance of curriculum items for interior design education in higher education.

## **3.2 System Models of the Framework and Hierarchy**

### **3.2.1 Analysis of the Indicate Items for Interior Design Curriculum Meet Industry Circles Expectations**

This research analyses relevant literatures, and obtains the professional curriculum items required by interior designers. There are total of twenty-five curriculum items factors, such as the design sketch, design drawing, computer-aided drawing, interior design, ergonomics, etc., as shown in Table 3. The characteristics of the factors are further analysed and summarized into three levels, such as: A. Interior planning and design, B. Interior design practice, C. Computer information technology, etc., as shown in Table 3.

### **3.2.2 Statistical Analysis of Delphi Expert Questionnaire**

In the first Delphi expert questionnaire survey of this study, 70% of the items, the expert opinions reached a medium to high degree of consistency. The results of statistical analysis of consensus and consistency is shown in Table 2. Therefore, this study needs to conduct the second Delphi expert questionnaire survey.

The second Delphi expert questionnaire survey showed that 96% of the items reached a high degree of consistency. Based on the criterion of consistency [8, 9], when the opinions of the expert group have more than 85% of the items, and reach a medium or above degree consistency, the Delphi expert questionnaire survey were completed. Therefore, this study conducted twice Delphi expert questionnaire surveys [10].

**Table 2.** The results of statistical analysis of consensus and consistency

Professional competence indicate system	Expert consistency	Number of items (percentage)	
		The 1st Delphi Expert Questionnaire Survey	The 2nd Delphi Expert Questionnaire Survey
Curriculum Design Items for Interior Design Education in Higher Education	Highly consistent	12 (48%)	22 (96%)
	Medium consistent	8 (32%)	1 (4%)
	Low consistent	5 (20%)	0 (0%)

## 4 Research Results Analysis

### 4.1 Statistical Analysis on the Importance of the Level Categories of Professional Curriculum Items

From the results of statistical analysis of Delphi expert questionnaire survey, it is found that the consensus value for each indicate items in the overall professional curriculum item are quite high, and the importance identification degree of each variable of the system indicates system is as high as 70%. After the indicates factor system are screened, the indicates items are reduced to twenty indicates items. The indicate items after screening account for 85% of the original indicates items.

According to the importance value results, each indicates obtains the average value of the importance recognition degree above 8.04. The Maximum value is as high as 9.58; the Minimum value is 7.02. Further analysis found that most of the opinions of the expert decision-making group showed a high degree of consensus. To sum up the above, the study found twenty significant indicate curriculum items in Level 3 (Level 3, the abbreviation code of each item is shown in Table 3).

In the statistical and analysis of professional curriculum level categories, the recognition degree of the importance of experts at the level of “Interior planning and design” (8.57) is the highest among the three levels, followed by “Interior design practice” (8.05), “Computer information technology” (7.78) (shown in Fig. 1).

### 4.2 Statistical Analysis of the Importance of the Indicate Curriculum Items

According to the importance level of the Delphi expert questionnaire results, there are twenty-two items (96%) with high degree of consistency, one item (4%) with moderate degree of consistency, and zero items with low degree of consistency (0%). Therefore, the indicates items has reached a high degree of consistency. Among the professional curriculum items, through analysis shows that the top ten indicate curriculum items of the importance of experts are as follows: “Interior shop drawing” (8.78), “Computer-aided drawing” (8.70), “Interior design” (8.68), “Interior design drawing” (8.57), “Ergonomics” (8.51), “Interior space plan” (8.45), “Interior physical environment” (8.42), “Illumination design” (8.38), “Furnishings art” (8.35), “Construction and materials” (8.30) (shown in Fig. 2).

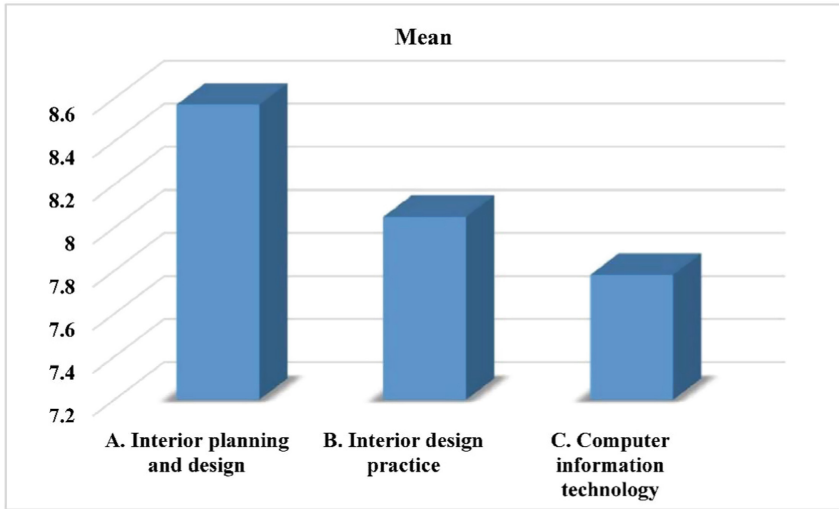


Fig. 1. Professional curriculum level categories of the recognition degree of the importance.

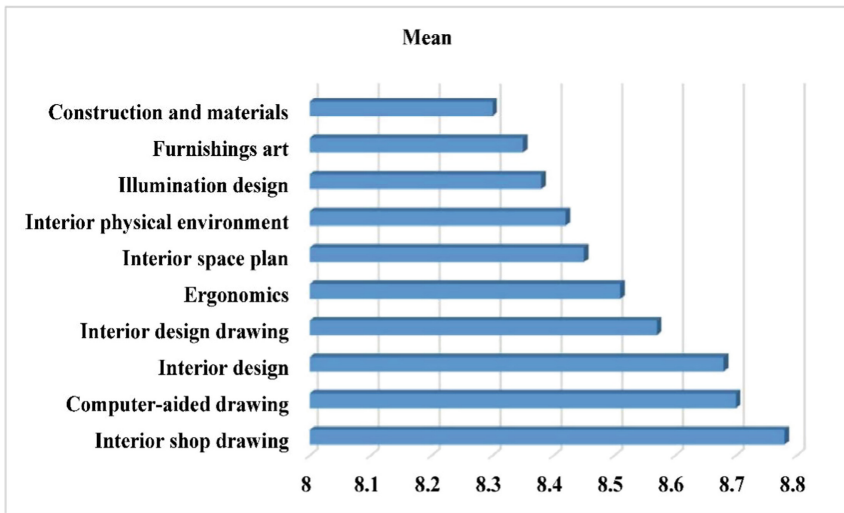


Fig. 2. The top ten indicate curriculum items of the importance of experts.

Through the implementation of twice Delphi expert questionnaires, it is shown that there are three levels of professional curriculum level categories; professional curriculum items are twenty items (shown in Table 3).

**Table 3.** Statistical analysis of Delphi expert questionnaire of the indicates items.

Professional curriculum level category	Mean	Importance sequence value	Coding	Professional curriculum item factor	Mean	Standard deviation	Importance sequence value
A. Interior planning and design	8.57	1	A-1	Design sketch	7.35	1.12	22
			A-2	Design concept	7.02	1.85	25
			A-3	Color plan	7.88	1.95	17
			A-4	Design drawing	7.32	0.98	23
			A-5	Interior design drawing	8.57	0.78	4
			A-6	Interior design	8.68	1.65	3
			A-7	Design principle	7.70	0.93	18
			A-8	Furnishings art	8.35	1.25	9
			A-9	Graduation design	8.21	1.97	12
			A-10	Illumination design	8.38	1.63	8
			A-11	Interior physical environment	8.42	1.78	7
			A-12	Interior space plan	8.45	1.11	6
			A-13	Landscaping and design	8.18	1.03	13
B. Interior design practice	8.05	2	B-1	Interior shop drawing	8.78	1.62	1
			B-2	Photography and image processing	8.08	1.57	14
			B-3	Design marketing	7.65	0.95	19
			B-4	Design history	7.45	1.36	21
			B-5	Construction and materials	8.30	0.78	10
			B-6	Ergonomics	8.51	1.57	5
			B-7	Furniture design	8.26	0.81	11
			B-8	Interior space regulations	7.51	0.96	20
			B-9	Engineering management and construction	7.93	0.63	16
			B-10	Engineering valuation	7.95	0.52	15
C. Computer information technology	7.78	3	C-1	Computer-aided drawing	8.70	1.21	2
			C-2	Building information modeling	7.25	1.02	24

## 5 Conclusions

After analysing the literature, this study used the Delphi Method to conduct an expert questionnaire survey. The study is mainly to exploring the interior design curriculum in response to industrial circles expectations of technology capabilities in Taiwan. The main results and conclusions of this study are as follows.

- University education requires intensive key professional curriculum items.  
According to the research results, among the ten key courses for interior design talents professional training required by the industry circles expectations, professional courses such as “Interior shop drawing”, “Computer-aided drawing” and “Interior Design” are the most important.
- The level category of “Interior planning and design” is the key level of interior design talent cultivation  
After statistical analysis, it was found that the level category of “interior planning and design” accounted for as many as six items in the top ten professional courses. Therefore, the basic training and development of professional ability in school education is obviously closely related to the satisfaction of future workplace employment [11, 12].
- The professional ability of interior design practice needs to be strengthened  
Through research results, it is found that interior design is a practical science. Although it needs to be based on aesthetic literacy and design theory, it still needs to be further implemented through practical experience [13].
- Encourage schools to offer more innovative courses and compulsory courses  
Due to the limitations of the current educational system and institutional norms, the number of compulsory courses offered by schools is insufficient. This factor is also the key reason that the expert group unanimously agrees that the key reasons why interior design graduates are unable to acquire more professional competence.
- Reduce the gap between school curriculum education and professional skills requirements  
Through research and analysis, it is found that hiring more teachers with practical experience in the industry and increasing students’ practical internship courses will have a significant effect on reducing the gap between school curriculum education and professional skills demand.

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