

# Learning Satisfaction of Learners and Curriculum Design Under Different Online Teaching Platforms

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Yuanyuan He, Xin Fu<sup>(✉)</sup>  
Wuhan Textile University, Wuhan, China  
Fuxin@wtu.edu.cn

**Abstract**—Learner-centered online education philosophy has been applied extensively and online learning is appreciated by more people. With good interaction, enjoyments and simulation, online learning increases learning experiences and harvests of learners. However, since more online learning platforms focus on education technological development and ignore firsthand experiences of learners, they pay few attentions to learning satisfaction of learners. In this study, the influences of four curriculum design aspects of online teaching on learning satisfaction of learners were investigated by a questionnaire survey to students. Moreover, differences in learning satisfaction of learners caused by different online teaching platforms were analyzed. Results demonstrate that content design and activity design of online teaching can improve learning satisfaction of learners effectively, while object design and evaluation design fail to improve learning satisfaction of learners effectively. Samples used in different platforms have significant influences on learning satisfaction. Samples of different majors all show significant influences on learning satisfaction. Conclusions can provide important references on how to improve curriculum design quality of online teaching and increase the online teaching design ability and technological application ability of teachers to make university students become individual learning subjects and improve their online learning satisfaction.

**Keywords**—online teaching platform, curriculum design, learners, learning satisfaction

## 1 Introduction

In the era of 5G network, online learning becomes a new education mode. In particular, artificial intelligence and big data technology penetrate the education field comprehensively, which brings significant changes in the temporal-spatial distribution and mode of online learning. More learners choose online learning. Online learning is a digitized transformation of self-learning and it is to improve learning efficiency, increase learning experiences, expand learning depth and trains high-order thinking mode of learners. In particular, many universities in the world have to transfer from traditional classroom teaching to online learning after the global outburst of COVID-19 epidemics.

Universities in China also face such challenges. Transformation from traditional classroom teaching to online teaching is not to build the online learning platform simply, but also asks teachers to make secondary development of online courses. Facing a new field, teachers have to consider the individual demands of different learners, pay attention to their intrinsic learning efficacy and improve their overall learning satisfaction. Since the implementation of China's Education Modernization 2035, most schools in China (including universities, middle schools and primary schools) have conducted reform of information-based teaching, but schedule and depth are different. In particular, epidemic factors force various schools and teachers to adopt online teaching. "Class suspended but learning continued" becomes an essential choice of China's education in the background of fighting against the COVID-19 epidemics. It is also a thorough reform in the education philosophy, mode and student's learning styles in China's education.

Mobile communication technology makes online learning more convenient and more network courses are provided on different education platforms in China, accompanied by continuous increase in quantity. However, course quality is doubted extensively. Particularly, learners are not so satisfied with online courses for single teaching mode, simple video play and lack of individualized interaction. Many researchers have demonstrated that most learners are relatively familiar with online learning mode and have a clear knowledge on teaching content and objective. They are relatively satisfying to learning experiences of online courses. Online courses of some online platforms are provided by recorded broadcast and live broadcast, but lack of analysis and curriculum design for learners, thus resulting in poor outcomes of online learning. During online learning, there are not only few teacher-student interactions and inadequate depth of interaction, but also single linguistic expression and delayed emotional expression, thus resulting in great differences of learning satisfaction. Moreover, it is an interactive learning relationship between teachers and students. Teaching mode of online learning can be enriched through group cooperation, team discussion and high-grade students guiding low-grade students, which solves shortages of online learning that teachers and students don't meet each other. Online learning is also an individualized learning process and different learners also have different utilization degrees of online learning resources. Therefore, online learning platforms can produce a learning big database effectively through real-time dynamic analysis on individual and fragmented learning outcomes of learners. Through big data analysis method, dynamic analysis is needed to progresses in learning tasks, realization of learning objective and comprehension of difficult knowledge of learners, which can recognize their learning shortages accurately and proposed improvement measures. By guiding learners with more scientific resources, technological assistance and learning strategies, it can realize data driving force of online learning, meet their individual learning needs, enrich their learning experiences and increase learning efficacy. These are beneficial to improve learning satisfaction of learners.

## **2 Literature review and research hypothesis**

How do curriculum design influences satisfaction and learning performances of learners under different teaching platforms has been studied extensively. According to many studies, students gain good experiences of curriculum design and report high satisfaction. They have positive evaluation to curriculum effect, which is consistent with research conclusions on teaching effect. Nevertheless, some studies have different conclusions. Yang [1] pointed out that academic performances of students who adopt WebQuest mode are better than those of student who use traditional IT comprehensive course teaching and students are very satisfied and identify with task-oriented WebQuest courses. Ha et al. [2] investigated association between two methods that providing courses and knowledge acquisition. Research results demonstrate that teachers' improvement curriculum can effectively improve medical knowledge acquisition of resident doctors and increase satisfaction degree of learners. Smith et al. [3] found that work-integrated learning can increase learning satisfaction effectively. In particular, excellent curriculum design is closely related with general learning outcomes of students. Noh [4] carried out curriculum design for Information Science of library and applied teaching program and some manuals in this curriculum. Results showed that this curriculum design improved learning satisfaction of students effectively. Curran et al. [5] evaluated longitudinal influences of introducing in inter-professional education (IPE) on students' attitudes toward IPE and team cooperation. Results showed that there are significant differences in attitudes of students of different professionals and their satisfaction to IPE. Students present relatively higher satisfaction degrees to IPE. Parmelee et al. [6] analyzed influences of team learning on improving learning satisfaction of students in medical education. Results demonstrated that curriculum teaching model using team cooperation could improve students' satisfaction to professional development and team experiences as well as peer evaluation satisfaction. Regehr et al. [7] studied from three aspects, including knowledge of students, student-teacher inaction properties and learning satisfaction. Results showed that increasing professional knowledge of specific problem doesn't influence the knowledge acquisition and tutorship of students or students' satisfaction to tutorship experiences. Farrell et al. [8] discovered that cooperative learning created supportive team experiences to help students develop discussion skills and participate in contents of international accounts better. Caza et al. [9] analyzed influences of curriculum redesign of teachers from the Business Schools on training of students' satisfaction and professional confidence. Results show that new experiential graduation project adapting to development demands of enterprises can improve learning satisfaction and professional self-efficacy effectively, and the overall experimental curriculum redesign is related with attitudes and confidence of students. Huang et al. [10] discussed the relationship between curriculum design and learning satisfaction by choosing university students in Taiwan as respondents. He found that curriculum design and "learning environment" have significantly positive correlations in term of learning satisfaction. Ten Eyck et al. [11] discovered that simulation discussion in curriculum design could improve learning satisfaction effectively. Ellili-Cherif et al. [12] demonstrated that if teachers use better resource materials in teaching activities, it can help teachers and students to strengthen learning process and

improve performances of learning. O'Connor et al. [13] can improve leadership level of nurses by using quality improvement process method in the nursing curriculum. Azer et al. [14] believed that using inquiry learning and encouraging students to finish tasks in groups can effectively improve students' attitudes toward the completed tasks and application of learning knowledge and then improve their academic performances. Jel-sing et al. [15] deemed that optimizing curriculum integration and providing flexible curriculums in courses to clinical medical students are conducive to improve positive learning and satisfaction of university students. Smith et al. [16] believed that tourism vocational education is a problem that involves globalization and it can improve long-term knowledge mastering of learners if teachers use education knowledge from a more global perspective in curriculum planning of tourism management. Meanwhile, a case study based on tourism and hotel management school in Puerto Rico was carried out. Ramalho et al. [17] argued that increasing more innovative and interesting curriculum design contents in elective courses determines students' satisfaction to the elective courses. Conclusions improved understanding on optimal practices to meet students' satisfaction. Brooman et al. [18] studied validity of teacher-dominated module curriculum redesign and results showed that validity of teachers' curriculum design can be proved by the improved feedback, attendance and scores. Carey [19] found that meaningful participation in curriculum design of students can help teachers to revise the culture and process of curriculum decision-making of universities. Allenbaugh et al. [20] proved that using teaching methods, video demonstrations and role play in courses can improve knowledge and attitudes of resident doctors and nurses effectively. Resident doctors and nurses observed that their clinical communication skills have been improved significantly in most fields. Bleakley [21] believed that medical humanity is an important media of reflection on medical practices. Particularly, it addresses the problem of how can medical students learn to communicate with patients and colleagues better and how they become reform pushers in medical progresses through innovations. In curriculum design, introducing and learning the cultural-historical activity theory can improve learning satisfaction and operation skills of medical students effectively. Bligh et al. [22] believed that teachers must be equipped with essential skills and resources to implement reforms in curriculum design and development. Only in this way that potential academic performances of learners can be improved. Mohammadi et al. [23] chose 181 undergraduates as samples and found that learning satisfaction of university students is closely related to the quality of teaching content. Based on existing studies, curriculum quality of teachers influences academic performances and satisfaction of university students for both traditional classroom teaching mode and online teaching mode. A good curriculum design can improve curriculum quality effectively and meet intrinsic learning efficacy of learners. In view of the development trend, online teaching can integrate with 5G technology and big data technology better. Driven information technology and energization of new education philosophy, learners become the knowledge pursuit of lifelong learning. Therefore, learning satisfaction of learners can be improved effectively as long as curriculum design of online learning courses is improved continuously. Based on opinions of existing studies, the following five hypotheses are proposed:

- H1: Object design of online teaching cannot improve the learning satisfaction of learners.
- H2: Content design of online teaching can improve the learning satisfaction of learners.
- H3: Activity design of online teaching can improve the learning satisfaction of learners.
- H4: Evaluation design of online teaching cannot improve the learning satisfaction of learners.
- H5: There are significant differences in learning satisfaction under different teaching platforms.

### **3 Method**

#### **3.1 Research model**

According to the analysis framework of IPO, online teaching is a process that teachers and students input and realize effective knowledge transformation and output through online learning platforms. With respect to this consideration, a questionnaire was designed. Firstly, the input part mainly considers various online teaching environments and mainly investigates the mainstream choices of online teaching platforms in China. The process part is corresponding to various curriculum designs of teachers for online teaching courses. According to existing research conclusions, object design, content design, activity design and evaluation design of online teaching were considered. The research team refined the questionnaire design according to existing studies. Object design, content design, activity design and evaluation design of online teaching have 4, 4, 3 and 5 questions, respectively. The output part is corresponding to learning satisfaction of line students and four questions were designed.

#### **3.2 Research objects**

Recently, Wuhan has been strengthening overall planning of education informationization work and published the “13th Five-year” Plan of Education Informationization of Wuhan, which regulates to promote information construction of all universities in Wuhan by strengthening basic conditions for education informationization, co-building and sharing high-quality digital resources and accelerating various education informationization processes. In this study, teachers and students from the School of Economics and Management of a university in Wuhan were chosen as the respondents. During COVID-19 epidemics, the Education Ministry of Wuhan has printed a series of online teaching notices and universities in Wuhan have published online teaching guidance and opinions successively. Professional teachers from the school of economics and management of the chosen university also carried out online teaching. All teachers have formulated very detailed online teaching programs and accomplished relevant online teaching tasks well in the spring semester of 2020. The questionnaire survey was

carried out offline and paper-form questionnaires were collected. A total of 209 questionnaires were sent during the break, among which 192 questionnaires were collected. After invalid questionnaires and questionnaires with consistent choices were deleted, 178 valid ones were gained, showing a collection efficiency of 85.17%. Specific descriptive statistics of respondents are shown in Table 1.

**Table 1.** Descriptive statistics of respondents

Name	Options	Codes	Frequency number	Percentage (%)	Cumulative percentage (%)
Grade	Freshman	1	22	12.36	12.36
	Sophomore	2	41	23.03	35.39
	Junior	3	93	52.25	87.64
	Senior	4	22	12.36	100
Gender	Male	1	77	43.26	43.26
	Female	2	101	56.74	100
Platforms	QQ group	1	10	5.62	5.62
	Other platforms	2	18	10.11	15.73
	Tencent Classroom	3	112	62.92	78.65
	Tencent meeting	4	38	21.35	100
Majors	Economics	1	21	11.8	11.8
	Human Resource Management	2	27	15.17	26.97
	Finance	3	44	24.72	51.69
	Accounting	4	55	30.9	82.58
	Master Business Administration (MBA)	5	31	17.42	100
Total			178	100	100

It can be seen from Table 1 that junior respondents account for the highest proportion (52%) because professional courses of junior are learned in one semester and they generally are very willing to participate in questionnaire survey. With respect to gender, the number of females is higher than that of males. Since respondents are chosen from students of the School of Economics and Management, there are generally more girls than boys. For the used platforms, the proportion of students using Tencent Classroom is the highest (62.92%). This is mainly because the live broadcast of Tencent Classroom is simple and clear, which is preferred by most university teachers. Moreover, university students are more willing to accept the Tencent Classroom APP. With respect to major distribution, most students major in Accounting. This might be because Accounting is the traditional advantageous major of the school and it has 6 classes, which is more than number of classes (2-3) of other majors. To sum up, respondent distribution is generally balanced and reasonable and there's a good basis for respondents.

## 4 Results analysis

### 4.1 Reliability and validity test

Reliability analysis is used to study answer reliability and accuracy of answers of quantitative data. In this study, the reliability of the questionnaire was analyzed firstly, which was measured by the common Cronbach  $\alpha$ .

It can be seen from Table 2 that Cronbach  $\alpha$  is 0.856, which is higher than 0.8, indicating the research data has high-reliability quality. For the “ $\alpha$  coefficient with item deleted”, the reliability coefficient won’t increase significantly after any question is deleted, indicating that the deleted question shall not be deleted.

**Table 2.** Cronbach  $\alpha$  coefficient

Variables	Question No.	Correction item-total correlation (CITC)	$\alpha$ coefficient with item deleted	Cronbach $\alpha$	Cronbach $\alpha$
Object design (Factor1)	A1	0.781	0.824	0.877	0.856
	A2	0.74	0.841		
	A3	0.713	0.851		
	A4	0.709	0.853		
Content design (Factor2)	B1	0.853	0.928	0.943	
	B2	0.874	0.922		
	B3	0.871	0.923		
	B4	0.854	0.928		
Activity design (Factor3)	C1	0.794	0.88	0.906	
	C2	0.817	0.861		
	C3	0.826	0.854		
Evaluation design (Factor4)	D1	0.848	0.916	0.935	
	D2	0.816	0.922		
	D3	0.817	0.922		
	D4	0.84	0.918		
	D5	0.814	0.922		
Learning satisfaction (Factor5)	Y1	0.782	0.881	0.906	
	Y2	0.781	0.882		
	Y3	0.805	0.873		
	Y4	0.792	0.878		

It can be seen from Table 3 that AVE values of 5 factors are higher than 0.5 and CR values are all higher than 0.7. This indicates that the analysis data have good polymerization (convergence) validity.

**Table 3.** AVE and CR index values of the model

Factor	Average variance extraction (AVE) value	Composite reliability (CR) value
Factor1	0.645	0.879
Factor2	0.805	0.943
Factor3	0.763	0.906
Factor4	0.744	0.935
Factor5	0.71	0.907

It can be seen from Table 4 for analysis of discrimination validity; the square roots of AVE of all factors are higher than the maximum of maximum correlation coefficients among factors, indicating good discrimination validity.

**Table 4.** Discrimination validity: Pearson correlation and the square root of AVE

	Factor1	Factor2	Factor3	Factor4	Factor5
Factor1	0.803	-	-	-	-
Factor2	0.244	0.897	-	-	-
Factor3	-0.063	0.173	0.874	-	-
Factor4	-0.111	0.072	0.515	0.863	-
Factor5	0.123	0.281	0.241	0.159	0.842

#### 4.2 Regression analysis

It can be seen from Table 5 that:

**H1 is not true.** object design of online teaching won't improve learning satisfaction of students significantly. Teachers pay more attention to curriculum design, but pay inadequate consideration to the learning objective that students have to realize, thus decreasing learning satisfaction of students. Since teaching objectives are not only knowledge acquisition, teachers shall pay more attention to ability training, changes of mentality and emotional exchange of learners. However, teachers emphasize on completion of teaching tasks in online teaching activity and they focus on knowledge teaching, thus concerning less and designing few activities for ability training and emotional exchange of students. As a result, learning satisfaction of university students is not affected significantly. This inspires universities that compared with traditional classroom teaching, online teaching which has shorter teaching time requires teachers to devote more efforts to object design of each unit and consider from multiple aspects, such as knowledge acquisition, ability training, emotional exchange, self-efficacy improvement, etc.

**H2 is true.** content design of online teaching can improve learning satisfaction of students significantly. This conclusion is consistent with opinions that are supported by most studies. This is mainly because online teaching involves more content than traditional classroom teaching mode and teachers have to reconstruct the knowledge system, pay more attention to key knowledge points and difficulty points. Content design of online teaching decreases interpretation of basic knowledge by emphasizing on design of key knowledge points and extracting them. It designs a mind map for knowledge



learning to make teaching content design simpler and clearer. In online learning, teachers can make full use of information technology to enrich online learning content, such as using 3D video to increase three-dimensional perception, using flash interaction for emotional exchange and providing more accurate PPT. Such excellent teaching content design breaks the traditional plane cognitive sense of textbook, increases more natural perceptions to skill operation, psychological interaction and other courses, and improves satisfaction of learners.

**H3 is true.** activity design of online teaching can improve learning satisfaction of students significantly. Activity design of online teaching can be more diversified. Compared with writing on blackboards in traditional classrooms, online teaching can improve intrinsic efficacy of learners through various activity designs, such as check-in within a limited time, pre-review, class interaction and review after class. In the process of online teaching, teachers will compress teaching time and increase interaction to strengthen enthusiasm of students in independent study. Attentions of students are improved and quality of online teaching is tested by asking questions through game-based learning, video connection, barrage and random questions. Particularly, most online learning platforms all can attract students through exercises, courseware sharing, knowledge quiz, random questions, brainstorming, group PK and group discussion. Students can focus on online teaching contents, and ignore influences of surrounding environmental changes, thus improving their learning satisfaction comprehensively.

**H4 is not true.** evaluation design of online teaching won't improve learning satisfaction of students significantly. This is mainly because current teaching platform evaluation mainly uses the combination of teacher evaluation and mutual evaluation of classmates. Due to lack of real-time monitoring on students, teachers can only evaluate students based on their impressions of the students in the past. Classmates cannot make full interactions like offline classroom teaching activities. Hence, mutual evaluation of classmates stays on their original impressions on classmates, but cannot provide scientific evaluation on learning of students. As a result, satisfaction of students is influenced significantly. Except for assessment scores in the statistics of various online platforms, how to use teacher evaluation and mutual evaluation of classmates has to be highly considered. Meanwhile, this inspires universities to make full use of series technological tools, teaching platforms and diversified evaluation of students in online teaching activities.

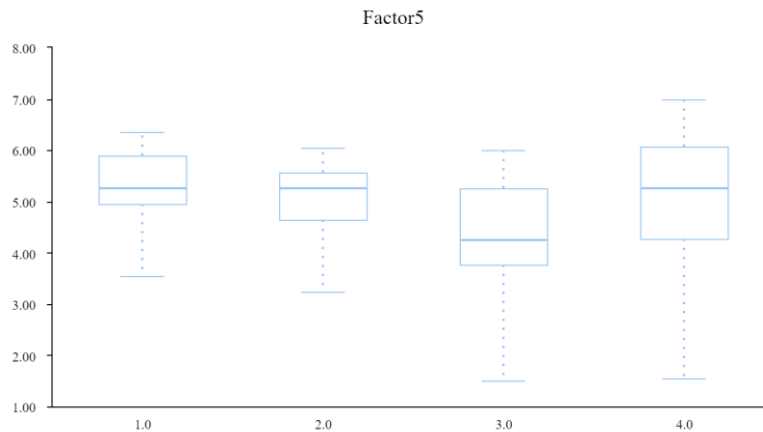
**Table 5.** Linear regression results

	Standardization coefficient	<i>T</i>	<i>p</i>	95% CI	VIF
	<i>Beta</i>				
Constants	-	4.911	0.000**	1.554 ~ 3.618	-
Factor1	0.062	0.74	0.46	-0.090 ~ 0.198	1.372
Factor2	0.176	2.092	0.038*	0.009 ~ 0.286	1.399
Factor3	0.225	3.016	0.003**	0.059 ~ 0.278	1.105
Factor4	0.086	1.162	0.247	-0.064 ~ 0.250	1.085

### 4.3 Effects of online teaching platform on learning satisfaction of learners

In the online teaching environment, teachers choose different teaching platforms mainly based on their understanding of the platform or the recommendation of other teachers. Most teachers have not compared the advantages and disadvantages of online teaching platforms carefully and choose with considerations to the curriculum. In the background that 5G information technology has been applied comprehensively, the network environment for online teaching is generally smooth and has rare Internet lags. This basically can meet online teaching demands. However, there are weak mobile signals in extremely remote areas and online teaching is restricted to some extent. According to respondents in this study, live broadcasts of Tencent Classroom, Dingding, Tencent Meeting and QQ Group are mainstream platforms that teachers chose to provide online teaching. The proportion of Tencent Classroom is the highest (62.92%). This is mainly because as a platform developed by a mainstream network enterprise in China, Tencent Classroom generally has reliable quality and it can be used for free, which meets the demands of teachers at different academic levels.

It can be seen from Figure 1 that H5 is true: learning satisfaction of different teaching platforms differs significantly. In this study, such differences in learning satisfaction among teaching platforms are investigated by non-parameter test. Clearly, different platform samples show significantly different learning satisfaction ( $p < 0.05$ ), indicating that there are differences in satisfaction among different platforms. It has to note that although most teachers choose live broadcasts on Tencent Classroom, some teachers choose other platforms. Therefore, students have to learn on different platforms. Since Tencent Classroom is used mostly, students are more familiar with it and they report relatively lower satisfaction with the platform. This reminds universities to pay attention to the phenomenon during online teaching that students feel less novelty of a platform after long-term use, thus decreasing their learning efficacy and satisfaction of the platform.



**Fig. 1.** Differences in online teaching environment

#### 4.4 Difference analysis

It can be seen from Table 6 that whether there are significant differences in learning satisfaction among different majors and different grades are tested by one-way analysis of variance. There are significant differences in learning satisfaction among different majors ( $p < 0.05$ ). Reasons are introduced as follows. Students from the School of Economics and Management were chosen as respondents. Since different majors have different histories, especially the MBA which was founded later, teachers are relatively young and like online teaching. They might spend more time in the design of online teaching content, thus resulting in the high learning satisfaction of MBA. There's another potential reason, MBA has fewer students and the small class might be more appropriate for online teaching mode. Teachers have more time and effort to be concerned about the psychological changes and learning effects of each student under a small class size. Hence, learning satisfaction of students is higher. However, there's no significant difference in learning satisfaction among different grades. This reflects that the general online learning satisfaction of the school may not change with grades and the online teaching level of teachers who are responsible for different grades is relatively balanced.

**Table 6.** Variance test

	Professional (mean±SD)					F	p
	1	2	3	4	5		
Learning satisfaction	(n=21)	(n=27)	(n=44)	(n=55)	(n=31)	3.464	0.009**
	4.70±1.22	4.24±1.06	4.49±1.17	4.99±0.98	5.02±0.86		
	1	2	3	4			
	(n=22)	(n=41)	(n=93)	(n=22)		1.642	0.182
	4.66±1.15	4.54±1.10	4.72±1.05	5.16±1.07			

\*  $p < 0.05$  \*\*  $p < 0.01$

## 5 Conclusions

Online learning in the Internet background has become a relatively habitual learning mode to all members of society. In this way, all members of the society can be acceptors and transmitters of the knowledge. Online learning platform weakens the teaching function and pays more attention to the knowledge acquisition process through independent learning. However, with the sharp increase of online learning methods and online courses, learning satisfaction of learners doesn't increase year by year. Online curriculum design of teachers is an important influencing factor. In this study, a questionnaire survey is carried out with students from the School of Economics and Management of a university in Chongqing, China. Influences of four aspects of teacher's curriculum design of online teaching (object design, content design, activity design and evaluation design) on learning satisfaction of learners were investigated. Differences in learning satisfaction of learners caused by online teaching platforms are analyzed. According to research results, content design and activity design of online teaching can improve

learning satisfaction of learners. There are significant differences of learning satisfaction among different platforms and different majors. It is recommended to carry out deep studies on the use of multi-subject evaluation technological tools, such as whether the interestingness of content design can attract learning enthusiasm of university students and whether integrating the contents of leading hotspot topics can improve their learning efficacy and learning states.

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## 7 Authors

**HE Yuanyuan**, Ph.D., is an associate professor at the College of Art and Design, Wuhan Textile University. Her research interests focus on visual communication and art design (email: fdhyuanyuan@163.com).

**FU Xin** is a professor at the College of Art and Design, Wuhan Textile University. His research interests focus on the application of design theory and environmental design, interior design and the protection of modern historical buildings (email: Fuxin@wtu.edu.cn).

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