# Exploration Teaching Practice of Integrating Traditional Culture into User Interface Design Course based on OBE-CDIO Model

Lei Qiao[1], Jirawat Vongphantuset [2*], Veerawat Sirivesmas [3]

{QIAO_L@SILPAKORN.EDU [1], 28857972@QQ.COM [2], VEERAWATSI@GMAIL.COM [3]}

Faculty of Decorative Arts, Silpakorn University, Bangkok, Thailand

**Abstract.** This study is based on the OBE-CDIO concept and conducts research and practice on the teaching reform of the "UI Design" course. An educational approach based on actual results and project cycles to promote the improvement and implementation of UI design courses. The teaching objectives are reconstructed based on students' learning results, and a teaching model of the design process is constructed that combines the needs of UI design positions with teaching objectives. Based on the OBE-CDIO concept, a course evaluation system was developed. Through group practice, practical teaching activities were carried out in two classes in the same school year, and the final results of different teaching modes of Class A and Class B were measured to draw conclusions to make continuous improvements to the curriculum. Through the multi-index teaching evaluation of "process and result", the teaching objectives of the course were effectively achieved, students' working ability was improved, and students' comprehensive quality was cultivated.

**Keywords:** Outcome-Based Education; Conceive Design Implement Operate; User Interface Design; Exploration Teaching Practice.

## 1 Introduction

OBE (Outcome-Based Education), The educational concept of outcome-oriented goal was proposed by Spady's, advocating "student-centered, outcome-oriented, continuous improvement" [1]. Thereby formulating course goals that are observable, attainable, teachable, and learnable. [2]. CDIO (Conceive Design Implement Operate) is a new concept of education reform created by four universities including MIT and KTH in recent years. It is project-driven as a carrier, allowing students to improve their understanding of theoretical knowledge in practice, stimulating students to actively learn, and improve their practical ability [3]. OBE-CDIO is a new education model that organically combines student-centered clear goals with conception-design-implementation-operation [4].

With the issuance of the 2015 "Guiding Opinions of the State Council on Actively Promoting the "Internet plus" Action, the rapid development of China's network and digitalization has been promoted [5]and guided internet companies to expand international markets. As a result, there is a shortage of application-oriented talents in the corresponding Internet industry.

NMDME 2023, October 13-15, Xi'an, People's Republic of China

DOI 10.4108/eai.13-10-2023.2341345

UI design (User Interface Design) is widely used in related industries led by Internet Plus. UI design includes three aspects. It consists of two parts: user and interface, but in fact it also includes the interactive relationship between user and interface, so it can be divided into three directions: user research, interaction design, and interface [6]. UI design involves many disciplines, covering market research, usability engineering, cognitive psychology, design, etc[7]. A complete set of UI design projects requires design from market research, competitive product analysis, user portraits, user experience processes, interactive prototypes, visual design, etc. The main goal of the UI design course is to enable students to understand the theoretical knowledge of UI design and improve students' practical abilities. The current teacher-centered course teaching model has weakened students' independent participation in learning, and students cannot realize the growth of learning and practical abilities in UI design courses.

On March 26, 2014, the “Guiding Outline for Improving Excellent Traditional Chinese Cultural Education” issued by the Ministry of Education of China stated that strengthening the education of excellent Chinese traditional culture is to cultivate and practice the core socialist values and implement the fundamental task [8]. Chinese President Xi Jinping has proposed to attach great importance to the inheritance and education of China’s excellent traditional culture. China’s excellent traditional culture is the most profound cultural soft power of the Chinese nation [9]. On November 29, 2022, “Traditional Chinese tea-making techniques and related customs” were included in the UNESCO Representative List of Human Intangible Cultural Heritage [10]. Tea culture is deeply integrated into Chinese people’s lives and is an important carrier of inheriting Chinese culture [11]. It marks that Chinese tea culture has become an important carrier for the mutual understanding and mutual understanding between China and the people of the world, and the integration and mutual learning between Chinese civilization and other civilizations in the world. It has become a cultural treasure common to all human civilizations [12]. Integrating Chinese traditional culture education into college courses can improve students’ independent learning and inquiry abilities of China’s excellent traditional culture and cultivate students’ awareness of cultural innovation.

This study is based on the OBE-CDIO educational concept and relies on the UI design course to integrate Chinese traditional cultural elements into the course. This study uses the Chinese Tea Culture APP design project as an exploratory practice to conduct exploratory reform practice research on UI design courses.

## 2 Establishment of UI design course model based on OBE-CDIO education concept.

### 2.1 Formulate teaching objectives of UI design course based on OBE concept

Reasonable formulation of course teaching objectives is an important prerequisite for course exploration and practice. Focusing on the new requirements put forward by the “New Art Subject” for the visual communication design major, the goals of the UI design course are divided into “knowledge goals, ability goals, and quality goals” combined with the learning performance pyramid mentioned by Spady’s in Outcome-based education in 1994[13]. As shown in Figure 1. The specific objectives of the UI design course are set as follows:

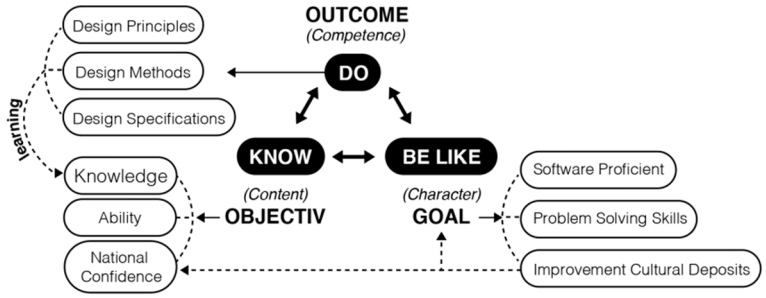


**Fig. 1.** Based on Spady's (1994) The learning performance pyramid, UI design course objectives.

**Knowledge goal:** Master the design principles, design methods, and design specifications in UI design, be able to independently complete UI prototype design, and be familiar with the application of related design software.

**Ability goal:** Able to use professional knowledge such as user research, market research, and competitive product analysis to scientifically explore user needs, be good at identifying problems, fully understand the backtesting steps of user experience, and gain insight into market trends. Improve students' design thinking, problem-solving abilities, and teamwork abilities.

**Quality goals to build national self-confidence:** Through the integration of traditional Chinese culture, students' cultural heritage is enhanced, national self-confidence and pride are enhanced, students can think independently and view things dialectically. Cultivate students' sense of innovation and craftsmanship so that students can continuously improve UI design projects.

### 2.2 Application of CDIO teaching concept in UI design courses

CDIO's educational philosophy focuses on the integration of teaching theory and practical projects, with a particular emphasis on ability development and interpersonal and team skills. Taking the UI design of the tea culture APP project as an example, we set up the project and reconstructed the UI design course content in four aspects according to the concept of CDIO. The framework is shown in Figure 2:

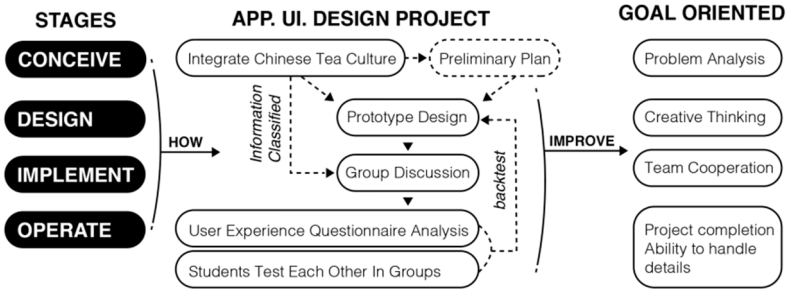


**Fig. 2.** Based on CDIO, UI design course objectives.

The four steps of UI design for the APP project with the theme of tea culture based on the CDIO concept are as follows:

**CONCEIVE:** Think about how to integrate the content of Chinese tea culture into the preliminary plan of the APPUI design project to improve students' analytical ability in handling practical problems.

**DESIGN:** Based on the preliminary plan, prototype design tools were used to design a tea culture-themed APP to improve students' prototype design capabilities and innovative thinking abilities.

**IMPLEMENT:** Discuss in groups, process and classify the content of Chinese tea culture, and design the APP project UI based on the classified projects based on the design prototype. Improve students' information processing abilities, teamwork abilities, and software application abilities.

**OPERATE:** Based on the questionnaire star user experience data, students were divided into groups to test each other and conduct backtesting of the APP project UI design in two ways. Adjust APP project UI design details based on backtest data. Improve students' understanding of project completion.

### 2.3 UI design course content structure based on OBE-CDIO education concept

Based on the analysis of OBE concepts and job requirements in the UI design industry, GOALS was established from the two aspects of learning and teaching, and then the UI design process was adjusted based on the four aspects of CDIO stages. Specific learning content is set based on teaching objectives and industry standards, and learning outcomes are preset, as shown in Figure 3. In order to subsequently measure the teaching effect of the new structure course model.

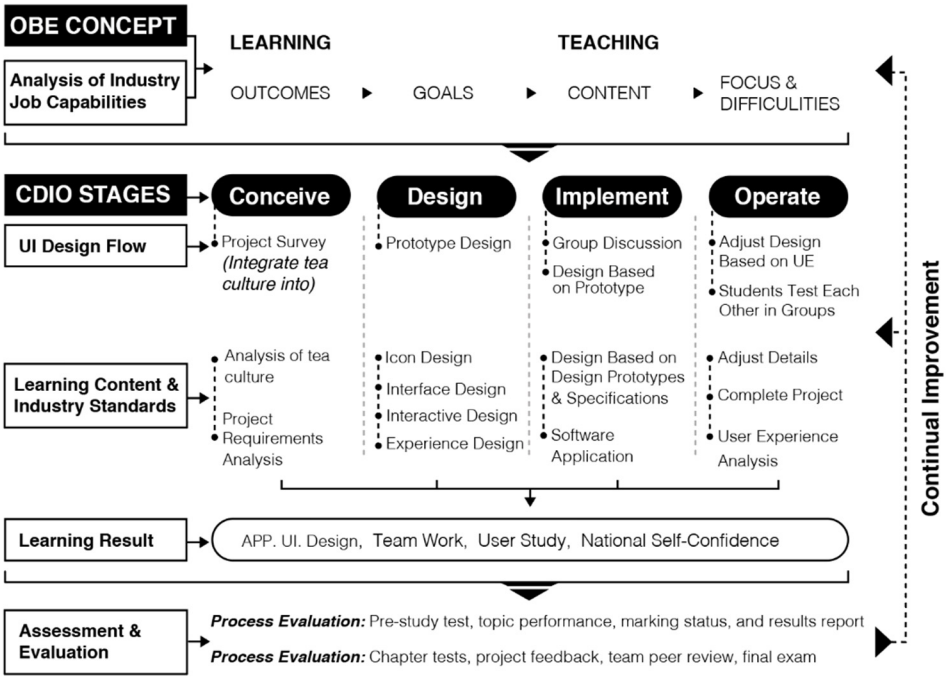


**Fig. 3.** Based on OBE-CDIO, Tea Culture Theme UI Design Course Objectives.

### 2.4 UI design course evaluation system based on OBE-CDIO education concept

Course evaluation is an important part of course effectiveness. The course evaluation results can be used to understand the degree to which students have achieved the course objectives and are also an important basis for further Continual Improvement. The principles of the course evaluation system adjusted according to OBE-CDIO are shown in Table 1:

A) Pay attention to the teaching of students and their understanding of traditional Chinese tea culture during the learning process.

B) Pay attention to the cultivation of teamwork according to the differences of students.

C) Introduce students' self-evaluation and peer-evaluation mechanisms, not just teachers to evaluate students' performance.

D) Pay attention to the assessment of course knowledge points and software application capabilities.

**Table 1.** UI design course evaluation comparison table based on OBE-CDIO concept

| Evaluation Content | Main Indicators | Assessment Method | Score Proportion |
|---|---|---|---|
| Learning Attitude & Habit Assessment | Student Attendance | Teacher Evaluation | 10% |
| | Homework Completion Status | | 10% |
| Design Stage Assessment | Evaluate Students' Completion of Phased Tasks According to Course Chapters | Student Assessment | 20% |
| Project Outcome Evaluation | Project Completion Status | Teacher Evaluation | 5% |
| | Project Feasibility | | 10% |
| | Team Work Ability | | 15% |
| | Project Reporting Skills | | 5% |
| National Self-Confidence | | Teacher Evaluation Student Assessment | 25% |
| Learning Feedback | | Student Questionnaire | for course improvement |

## 3 Results

Two classes of UI design courses were selected to test the teaching effect. Class A was tested using the original traditional teaching model, and Class B was tested using the UI design course based on the OBE-CDIO concept. The Chaoxing Learning System is used to conduct course teaching evaluation based on the relevant content of the evaluation comparison table. The data shown in Table 2 was obtained. Satisfaction measurement is carried out from 5 aspects. The measurement is divided into 4 levels: very satisfied, satisfied, and dissatisfied. It can be seen from the chart that Class B is very satisfied, and satisfaction has increased, while general and dissatisfied has decreased.

**Table 2.** Comparison table of course effect data for classes A and B

| | CLASS A | | | | CLASS B | | | |
|---|---|---|---|---|---|---|---|---|
| | V | S | G | D | V | S | G | D |
| Understanding of Learning Objectives | 10 | 12 | 2 | 0 | 12 | 11 | 1 | 0 |
| Course Attraction | 8 | 12 | 2 | 2 | 9 | 13 | 1 | 1 |
| Project-Based Teaching | 8 | 10 | 4 | 2 | 10 | 11 | 2 | 1 |
| Ability Improvement | 6 | 12 | 4 | 2 | 8 | 13 | 2 | 1 |
| Technical Mastery | 8 | 8 | 5 | 3 | 10 | 11 | 2 | 1 |
| Percentage | 33.3% | 45.0% | 14.2% | 7.5% | 40.8% | 49.2% | 6.7% | 3.3% |
| Percentage | 78.3% | | 21.7% | | 90.0% | | 10.0% | |

## 4 Conclusions

In summary, using the OBE-CDIO concept to reform and innovate UI design course teaching can effectively solve problems existing in traditional teaching, such as the disconnect between theory and practice and unsatisfactory course teaching effects. Using OBE-CDIO's advanced teaching concepts, the teaching objectives of the UI design course are optimized and focused on learning outcomes to make students' learning objectives clearer. Using the Chinese traditional tea culture APP design project as the teaching module of the course enables students to better learn by doing and improve their theoretical knowledge, practical ability, and overall quality. By effectively reforming the assessment methods of the course, diversified evaluation methods help to stimulate students' learning enthusiasm, thereby mobilizing their subjective initiative in learning, thereby activating the vitality and vitality of the entire course learning and achieving better teaching results.

## References


[1] Spady, W. G.: Organising for results: The basis of authentic restructuring and reform. Educational Leadership, October, pp. 4-8, US. (1988)

[2] Spady, W. G.: Outcome-based education: Critical issues and answers. American Association of School Administrators, pp. 55-60, US. (1994)

[3] Sin-Moh, C. Katerina, Y. Engaging today's millennials using curriculum based on chemical product design, Conference: 9th International Symposium on Advances in Technology Education, JPN (2015)

[4] Chunyan, L. & Di, L.: Construction of a practical teaching system for urban and rural planning majors based on the CDIO-OBE concept. Journal of Higher Education (29),110-115. CHN. (2022)

[5] Guiding Opinions of the State Council on Actively Promoting the "Internet Plus" Action https://www.gov.cn/zhengce/zhengceku/2015-07/04/content_10002.htm. CHN. (2015-07-04)

[6] Jian, Z. Manda, L.: UI Design and production. Southwest Normal University Press, pp. 6, CHN. (2015)

[7] Shneiderman, Ben. Plaisant, Catherine.: Designing the user interface: strategies for effective human-computer interaction - 4th ed., Pearson Education, Inc., pp. 5, US. (2005)

[8] Notice of the Ministry of Education on Issuing the "Guiding Outline for Improving Excellent Traditional Chinese Culture Education". http://www.moe.gov.cn/srcsite/A13/s7061/201403/t20140328_166543.html CHN. (2014-03-26)

[9] Xi Jinping talks about China’s excellent traditional culture: only those who are good at inheritance can be good at innovation
http://cpc.people.com.cn/xuexi/n1/2017/0213/c385476-29075643.html.CHN. (2017-02-13)
[10] "Traditional Chinese tea-making techniques and related customs" successfully applied for World Heritage. https://www.gov.cn/xinwen/2022-11/30/content_5729560.htm. CHN. (2022.11.30)
[11] Let's try new tea with new fire - the head of the Intangible Cultural Heritage Department of the Ministry of Culture and Tourism talks about the successful application of “Chinese traditional tea-making techniques and related customs” as a World Heritage. https://www.gov.cn/xinwen/2022-11/30/content_5729558.htm. CHN. (2022.11.30)
[12] Chengyin, L.: Interpretation of "Traditional Tea Processing Techniques and Associated Social Practices in China" China Tea, pp.49-53, CHN. (2023)
[13] Spady, W. G.: Outcome-based education: The learning performance pyramid. American Association of School Administrators, pp. 54, US. (1994)