Contrasting Industrial Design Education in the UK and China

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Abstract: This study aims to evaluate the strong and weak aspects of industrial design (ID) education in China by the comparison with the ID education in the UK. This study was conducted in four major phases. The study started with an analysis of the development context of industrial design education in these two countries and continued with an analysis of ID education using data on 10 cases with comprehensive factors, five universities particularly pertains to the UK and China. After identifying the entry requirements, research field, cultivate ability, education arrangement and method on undergraduate as the main aspects of the comparison, the similarities and differences in ID education between China and the UK were analyzed. The findings demonstrate that China is behind the UK in terms of cultivating ability, education arrangement and method. Moreover, the findings of this study will help to develop the ID program and will thus lead to better improve the training quality of graduates.

1. Introduction

It is quite clear that industrial design (ID) initially emerged in developed countries. Britain is the birthplace of the industrial design, early in the second half of the nineteenth Century, the Arts and Crafts movement represented by Willian Morris and Johe Ruskin has kicked off the British design reform movement. As early as 1837, the United Kingdom set up the Royal College of Art (Referred to as RCA). This National Art Institute affiliated to the British Trade Commission, was original design institute in the world. When it was imported by so-called developing countries, the development of industrial design experienced a different path from that of developed countries due to the economic, political, and social differences. A lot of literature on the history of Chinese industrial design education can be tracked from many published research papers and conferences since 2000. According to these documents, industrial design education occurred relatively late in China with a short history only for a few decades. Until the 1960s, educators gradually comprehended the nature of industrial design. Transformation of course name also reflected the process of acceptance and comprehension of the nature of Industrial Design. In 1960, the Light Industry Ministry of China developed a course named Light Industry commodity Modelling Artistic design at Wuxi Institute of Light Industry. In 1975, China's first industrial design department was established in Tsinghua University (www.ad.tsinghua.edu.cn). From this standpoint, the discussion of comparison of industrial design education between the UK and China is interesting since there are some characteristics that are relevant to industrial design development. The papers on industrial design education in the UK focus on pedagogy, there is hardly any research paper comparing industrial design education between China and Britain. Many comparisons of industrial design education between China and Western were conducted by China's industrial design education scholars [1]. After 2001, some Chinese industrial design graduates made some comparative studies between China and Western [1]. In 2010, Hu Zhongyan compared the industrial design courses between De Ford University, Northumbria University and Hunan

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University, Beijing Institute of Technology in curricula, and analyzed the advantages and limitations. With the development of the times, results of some existing researches are not suitable for today's industrial design education. The research for this paper had consulted various resources such as books, journals, conference papers, periodicals, and online resources were also reviewed. Online resources that were searched included: The ministry of education of the People's Republic, a Chinese university, UK universities, and Google Scholar. The aim of this paper is to contrast approaches and priorities for industrial design education in the UK and China.

2. Method

An analysis of ID education using data on undergraduate education programmer was prerequisite, data were rigorously collected from the official website such as the National Education Department and Universities, and subject to thematic analysis. Professional introduction and teaching arrangements can be obtained in the official website of the University, which is the basis of our comparative study.

Case studies have been described as an approach to research as opposed to a research method , with a capability "to describe and understand the phenomenon "in-depth" and "in the round" (completeness). A review of information providing potential undergraduate applicants through the UCAS website was conducted [2]. Searching for the course of industrial design and undergraduate degree, there were 84 providers founded, the Chinese gaokao website (http://www.gaokao.com) and China Education Online (http://www.eol.cn) indicated that searching for the course of industrial design, there were 321 specialized subjects provided by 261 universities. In this role, case studies serve a useful purpose, since many important issues can be overlooked in a more superficial survey .Overall considering numerous factors, we elected 10 cases. The 10 universities were chosen for the study including Tsinghua University (TU), Jiangnan University (JU), Zhejiang University (ZU), Tongji University (TU), Xi'an Jiao Tong University (XU), Loughborough University (LU), Brunel University (BU), Northumbria University (NU), Central St Martins University (CU), De Montfort University (DU).

A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language based or visual data. The data can consist of interview transcripts, participant observation field notes, journals, documents, open-ended survey responses, drawings, artefacts, photographs, video, Internet sites, e-mail correspondence, academic and fictional literature, and so on. In qualitative data analysis, a code is a researcher-generated construct that symbolizes or "translates" data.

2.1. Industrial Design Education

As a professional activity, industrial design is well defined, with prominent design historians identifying its origins during the industrial revolution when craft-based production changed to a process in which the creative form-giving became separated from the means of production i.e. designers did not make the items that they designed [3]. The largest and oldest professional society for industrial design is the Industrial Designers Society of America (IDSA) who define industrial design as: "... the professional service of creating and developing concepts and specifications that optimize (sic) the function, value and appearance of products and systems for the mutual benefit of both user and manufacturer". "industrial design" is still an overarching term used to define the specialities of product, automotive, and furniture design (and other micro-specialities) [4]. The term is often interchangeable with "Product Design", which has, over the years, evolved to include service, software, and physical product design [4]. The term 'industrial design' has associations with styling and ergonomics and can also be referred to as 'product design' [4]. In contrast, the term product design is not represented by any dedicated professional body [5], 'Product designers design things we use in our daily lives from vacuum cleaners to cars. They consider how to make items easier to use, more efficient, cheaper to produce or better looking' [6].

Two courses are very similar and both are to solve the issues of product design, which are three-dimensional industrial products or intangible services. Industrial design is more likely to address the

impact of technology in product design, and product design is more likely to address the impact of art in product design. The emphasis of product design is different in the UK, where product design focuses on study or professional activity that involves the more technical roles involved in new product development (employing predominantly scientific methods) [5]. The terms industrial design and product design are in common use and can refer to identical or contrasting professional activities [5].

A review of the course content available on the universities websites showed subtle differences in the structure of the Industrial Design courses at each institution. Some courses had a more technical and engineering focus, whilst other courses included, marketing, management or a specialism such as furniture, toys or sports equipment [2].

This paper acknowledges that industrial design education includes industrial and product design. Industrial design will be used to refer to the distinctive profession that is responsible for form-giving during product development as defined by the IDSA (2014).This research study considers students from a range of undergraduate courses. At an undergraduate level there is typically considered to be a distinction between a course that awards a Bachelor of the Arts degree (BA) and those that award a Bachelor of Science degree (BSc), whilst a small number of product design courses award a Bachelor of Engineering (BEng). This distinction between the BA in Industrial Design and Technology and the BSc in Product Design and Technology at Loughborough University for example is that the BA course is biased towards the user, whereas the BSc more focused on the underlying technology of the product. Hertfordshire University similarly runs a BA and a BSc course, but the titles are interchanged: the BSc is in Industrial design and the BA is in Product design. The differences are similar to Loughborough with the BSc course placing more emphasis on the manufacturing and technology than the BA, which places more emphasis on user centred design. However the BSc still includes some user consideration such as human factors. These underlying differences however are typically small in comparison to the similarities between the content of courses, but demonstrate that differences in the course content would appear to be related to the type of degree that is being awarded, rather than the course title [2].

2.2. Industrial Design Education in China

A lot of literature on the history of Chinese industrial design education can be tracked from many published research papers and conferences since 2000. The industrial design education in China is relatively late [7], which has developed only for nearly forty years. From the real comprehension of the connotation of industrial design to the present, it has experienced a period of origin, initial stage, development stage [8]. Start stop time and division basis are shown in Figure 1.

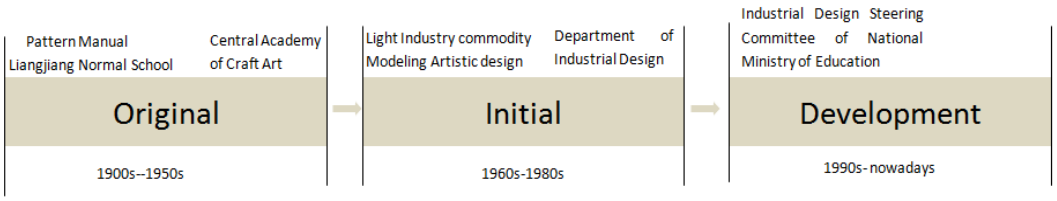

Figure 1 History of China industrial design education

China has not the concept of modern industrial design throughout the teaching system until 1983. In 1983 department of Fine Arts of Wuxi Institute of Light Industry changed its name to Department of Industrial Design. In 1984, Tsinghua University established Department of Industrial Design on the basis of Department of Industrial &Art. Before 2012, there was no product design in China, only the industrial design, affiliating to Mechanical, but ID was set up and belonged to Art in a large number of universities. After 2012, some of the Universities changed ID to product design (Tsinghua University), or created product design, issued BA degree while industrial design issued BA or BEng degree. According to statistics of the China National Ministry of Education (NME), before 2000, there are162 colleges in China established industrial design course, until 2005 the number reached 248, which does not include industrial design established in art design. From 2001 to 2005, the colleges establish industrial design course with an average growth rate of 8.99%. In

February 2017, a review of information provided potential undergraduate applicants through http://www.gaokao.com and http://www.eol.cnwas conducted. Searching for industrial design, there will be 261 universities and 321 providers founded.

2.3. Industrial Design Education in UK

As early as 1837, the United Kingdom set up the Royal College of Art (Referred to as RCA). This National Art Institute affiliated to the British Trade Commission, was original design institute in the world. The purpose is to guide industrial production with industrial design to meet the needs of the consumer market. In 1948, as a new focus on product design, the college was awarded a royal charter in 1967 to gain the right to an independent degree. It is the only university in the world with the right to confer Master's degrees in all arts and design majors, and now she has become a training institution that only provides graduate education.

There are a large number of degree courses offered in the UK that teach both industrial and product design [2]. Following the method of Matthew Alan Watkins, the author made the same review in February 2017. Searching for the course of industrial design and undergraduate degree, there were 84 providers founded, a total of 69 courses titled Product Design (include Product Design & Technology, Industrial Product Design, Product Design and Furniture) and 15 courses titled Industrial Design(include Industrial Design& Technology, Industrial Design for Industry). As a result of the review in 2013 and 2017, the number of universities offering industrial design education has not changed the professional name of the industrial design, which has undergone subtle changes.

2.4. The Choice of 5 Contrasting Industrial Design Courses in the UK

Choosing 5 cases in 84 samples is very complex and requires a lot of literature search and investigation. A Survey result owned by British Industrial Design Association (BIDA) makes case selection simple and credible. BIDA is a not-for-profit organization, run by a volunteer, elected board of designers. We selected the study subjects according to the survey results of the BIDA in 2015 revealed in January 2016. BIDA invited over 1000 design practitioners to share their experience. The question was simple; 'Which design schools create the most employable BA, BSc or BDes industrial or product design graduates?' Respondents selected up to 5 design schools, from a list of the current 70 institutions in the UK. Brunel and Loughborough University tied for first place each chosen by 55% of respondents, Northumbria University is second chosen by 46%, Central St Martins and De Montfort University tied for third place chosen by 46% (http://www.britishindustrialdesign.org.uk/news/design-school-survey-2015). The difference between these institutions and the other 62 was stark. Half were not chosen at all, and a further quarter was selected by only once or twice. One comment said:

"It appears to us that a few leading design schools are really well connected, delivering excellent coursework and placement programs. The academics at these institutions are experts in developing the skills and know how that helps people succeed in design. Other Universities purport to offer design courses, but in reality most of their graduates leave with a more generalist education. That just isn't what design employers need. Good candidates and potential employers need to know the difference."

The details of 5 Contrasting Industrial Design Courses in the UK are shown in Table 1.

Table 1 TOP 5 industrial design course in the UK

University	School	Course Name
LU	School of Design	Industrial Design and Technology Product Design and Technology
		Product Design and Technology
BU	College of Engineering, Design and Physical Sciences	Industrial Design and Technology
NU	School of Design	Design for Industry
CU	Product, Ceramic & Industrial Design Programme	Product Design
DU		Product Design

2.5. The Choice of 5 Industrial Design Courses in China

No any research result has consulted by official organization as the BIDA of UK in China, so we do not have any reliable ranking related to top 5 Chinese industrial design courses. Choosing 5 cases from 261 universities in China is quite difficult. So we synthesize various related ranking factors carefully when choosing the Chinese Industrial Design courses cases. The first we can refer to is the Disciplines Evaluation Results released by the Academic Degrees and Graduate Education Development Center in 2012, those evaluation objects were the first-liter discipline which has the graduate student training and the degree awarding qualifications. So first-liter disciplines design ranking and mechanical engineering ranking were analyzed. Another factor we refer to is "Ranking of Industrial Design Competitiveness of China University (2014-2015)" announced by Research Center for Chinese Science Evaluation. The third reference is the key courses construction. From 2007 to 2015, the Ministry of Education has constructed 11 key courses of ID in Universities. Based on the above three factors of China, five cases of China are shown in the Table2.

Table 2 The course of industrial design in China

University	School	Course name
TU	Academic of Art and design	Product design
JU	School of Design	Industrial Design
		Product design
ZU	College of computer science and technology	Industrial Design
TU	School of Design and Innovation	Industrial Design Product Design
XU	School of mechanics	Industrial Design

3. Result Analysis and Discussion

3.1. Differences between the UK and China Occur in Entry Requirements

There is a greater need for standardization of course content as well as the level of achievement in the UK foundation/preparatory year [9]. Foundation course is meant to provide a bridge between secondary education and an additional course in the rest of Britain. There are also foundation courses lasting two years to help applications to obtain their "O" and "A" level [9]. Five UK universities require applicants with design foundation. Chinese universities have different requirements, for example all PD courses require sketch ability, only some require design foundation, for ID course, and even does not require painting ability, such as Zhejiang University, Jiangnan University.

Table 3 The first two years of teaching arrangements of 4 cases

University	First year	Second year
LU	2-D sketching and drawing, 3-D physical modelling computer aided design and an understanding of basic electronics, mechanics and materials technologies	skills in product styling, user research, computer aided manufacturing, branding, and manufacturing and materials. design projects
BU	the technological, creative and practical skills necessary	ergonomics and design for manufacture.
JU	Cultivation of problem consciousness	the cultivation of the ability of user research, human factors engineering
TU	Design enlightenment cultivate students 'artistic consciousness and accomplishment, and cultivate students' overall design concept.	Learning morphological semantics, functions, materials and structures, technology-related materials and process knowledge. concerning about the user, behavior, methods, man-machine with the interactive point, preliminary learning design analysis, user research.

Compared with the first two years of teaching arrangements of 4 cases from Table 3, the primary

task of first year in Tongji university is the design enlightenment, aims to cultivate their artistic awareness and accomplishment, and the aim of Jiangnan University is to cultivate problem consciousness, however, Loughborough University aims to help first year students develop designing and making skills, similar to the aim of second year in Tongji University. The students of year-one in Brunel university are mainly in the studio using CNC milling machine, vacuum forming machine, laser cutting machine, drilling machine, sanding machine, polishing machine, sandblasting and other equipment processing a variety of materials, engaged in product design work to accumulate the basic material processing knowledge [10]. The finding is British industrial design students cultivate design capacity through the arrangement of the curriculum in the first year, Chinese industrial design students participate in the design curriculum in the next semester of first year or Second year. The reason for this delayed arrangement is that the students with the background of science have not design foundation. Chinese students who have not sketch or design foundation need to pay more effort in learning industrial design. They often choose to take part in social training institutions such as Huangshan sketch factory on holiday, where mainly to provide sketch, computer-aided design, design creative training, as of September 2017, 50,000 design talents were trained in Huangshan sketch factory (http://www.hsshouhui.com). At present, in addition to Huangshan sketch factory, Beijing Viking, IDKAOYAN, FENGBIAO and other professional training institutions, many industrial design companies are also engaged in industrial design education and training, which complement each other with university education.

3.2. Ten Universities Have Different Focuses of Industrial Design Comprehension and Introduction of Industrial Design

It is easy to find the introduction of industrial design in the official website of ten universities. Through the qualitative analysis and comparison of professional introduction, the emphasis on industrial design is different, which will affect the education arrangement. The conclusions are shown in Figure 2.

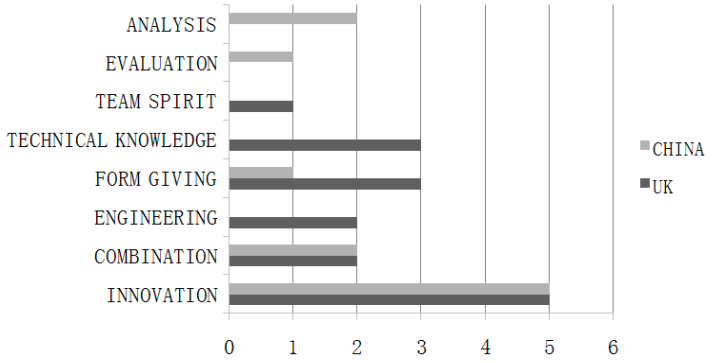

Figure 2 The focuses of industrial design introduction in UK and China

The industrial design introduction of the ten cases has some common characteristics that are innovation and combination, which is essential in the field of industrial design, and the difference lies in the different extent of training. Zhejiang University focuses on cultivating students a solid “innovation talent” and “system capacity”. The result of the incubation is innovation and entrepreneurial design talent, who have the ability to integrate across the field [11]. The aim of Northumbria University is “this course aims to inspire and empower graduate industrial designers with the knowledge, skills and creative confidence to create sustainable products, systems and experiences relevant to the needs of people, society and business”. The cross of the industrial design profession determines the ability of students to integrate. Tsinghua University in the undergraduate high-level stage, through the project-driven design training develops students’ cross-disciplinary knowledge and integration design capabilities. Industrial design of China focuses on analysis and evaluation, but industrial design of UK focuses on technical knowledge and form giving, which can also be confirmed from the placement arrangements [12]. The reason is industrial design education system of 10 cases is different, the UK emphasizes the design education in the integration of

science and technology, Engineering and Design School of Brunel University pursues industrial design innovation in the integration of science and technology, design education requires the integration of multidisciplinary expertise in machinery, electronics, and artificial intelligence [10]. China's industrial design education is basically based on Bauhaus's design education theory system modeled, so students can design a new shape for the product, but no knowledge of the internal structure, cannot grasp the complete product innovation process. Tsinghua University and Jiangnan University have established a research-based education system [11].

3.3. Differences Quantity of Training Ability Between UK and China

Education arrangements can be found on the official website of five universities of UK, from year one to final year, and the training objectives are different and gradual. There is no description of the training objectives of each year on the official website of five Chinese universities, which were reflected in the education arrangement. Coding method was used to classify and analyze these quantities of training ability. The conclusions are shown in Figure 3.

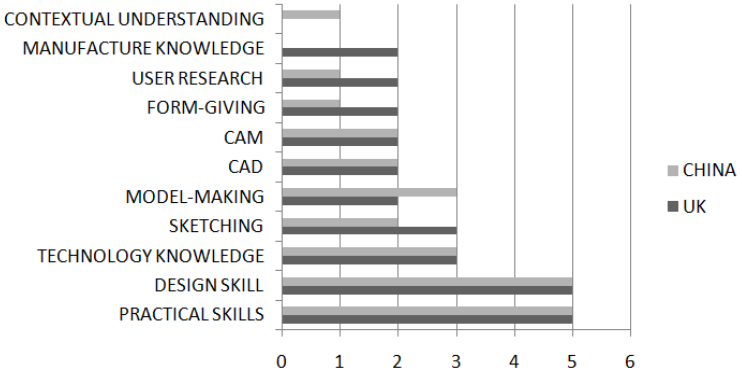

Figure 3 The quantities of training ability in UK and China

Five UK universities mainly cultivated students from these aspects including design skill, practical ability, technology, sketching, model-making, CAD/CAM, form-giving, user research and manufacture. The cultivation of five Chinese universities is very similar to that of in the UK universities, but the attention is not the same. Five universities in China and UK focused on cultivating design skill and practical ability, three universities in China and UK focused on cultivating technology knowledge, and two universities in China and UK focused on CAD/CAM.

The most difference is that Chinese universities focus on the contextual understanding, and numerous general curricula are arranged. According to Cooper and Press's (1995) sorting method, courses contained in undergraduate education were divided into design theory, design knowledge and contextual understanding. Central St Martins University divided all curricula into Design Studies, Technical Studies, and Contextual Studies. British professional settings more targeted, more professionally divided, and more clearly defined. Curricula of British universities are basically design courses, and year-one students can contact the design practice courses. Specialization of the program is conducive to guiding students in the professional direction of learning more profound and more refined, and they can quickly adapt to the professional work; however, the limitations are obvious, that is, if students can not engage in the professional work after graduation due to many reasons, the ability to adapt to other posts is weak, and the transfer to other industries will encounter more difficulties. Professor Wang Mingzhi, vice president of Tsinghua University, believes that the curricula system can be divided into four aspects: the overall quality, professional knowledge, creative ability and expression skills [7]. In recent years, China's universities have attached importance to the general education, so the proportion of general curricula increased [7]. Diversifications of industrial design in higher education have been unable to keep up with the flexible requirement of the design talents, such as the recent emergence of interactive design, experience design, service design and so on [11]. The higher the professionalism of higher education, the harder it is for graduates to adapt to the variety work, the worse the situation may be. China's current industrial upgrading and the establishment of innovative and harmonious society

require higher education to cultivate in-depth comprehension of human nature, market and social talent. Globalization trend brought about the conflicts between the multi-cultural conflict and the same urgent need for general education. General education and professional education complement each other, in close connection [13]. For example, general curriculum of Jiangnan University is set on a unified foundation platform, borne by various professional teachers. All curricula are led by problem consciousness, whether it is morphological problems, structural problems, behavioral problems, or expressions [13]. In the industrial design professional training program of Xi'an Jiaotong University, the curricula are divided into three types: general curricula, discipline platform curricula, professional curricula. General education curricula occupies a large proportion that are adapted to "thick foundation", which Chinese today's higher education advocates.

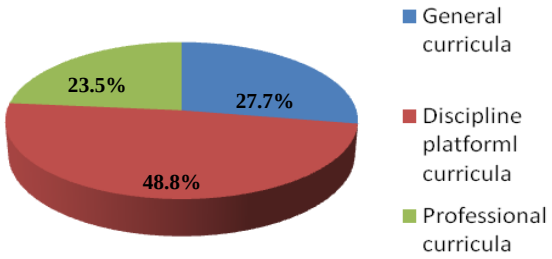

Figure 4 The structure and credit distribution of industrial design of Xi'an Jiaotong University

3.4. Areas of Study of Ten Courses are Distinctive

"National Medium and Long-term Education Reform and Development Plan (2010-2020)" pointed out that "to overcome homogeneity tendencies, the formation of their own ideas and style, at different levels, different areas to do the characteristics" [13]. Industrial design contains different professional background, resource support and geographical environment, and the universities are exploring professional characteristics, research areas concerned about social issues [11]. Having examined the detailed ID course content of 10 cases, we can discover that all aims to train oriented designers based on specialization. What makes distinct is that the expression of UK universities is prone to various design methods, while the expression of Chinese universities pays more attention to the different types of products. For instance, Loughborough University focuses on a highly user-centred approach to design, Jiangnan University focuses on new product development for internet, networking and other information technology industry. Regardless of the method concept or the specific product category, 10 cases of research areas are followed by the development trend of science and technology.

Table 4 Areas of study of ten courses

University	Areas of study
LU	a highly user-centered approach to design and the creation of beautiful, technically viable products
BU	commercial awareness, technical skills and ability to innovate
NU	a critical, analytical and creative approach to real life challenges
CU	a purely market-orientated and problem-solving approach to a more analytical and critical approach. including those provided by related and emerging disciplines such as sociology, politics, ethics, interaction design, service design, and experience design
DU	Studying the functional and market-led requirements of product and furniture design, including ergonomics, aesthetics and usability. Specific areas include visual language, branding, user-centred design, Computer Aided Design (CAD), sustainability and the development of socially-conscious products that, through technical specification, reduce waste and conserve energy
TU	Product innovation,Experience design, Service design
JU	User research, Interaction design, Engineering design, New product development for internet, Networking and other information technology industry
ZU	Product &Intelligent systems and services design
TU	Product design,Brand,Service, Strategy and System design
XU	Industrial products, Human machine interface,User experience and service

3.5. Perfect Educational Methods has been Established in the UK and China

In order to achieve professional characteristics, Sino-British Universities have established education methods suitable for their own industrial design.

3.5.1. The Importance of Placement and Practice

Generally speaking, industrial design courses at the 5 universities in the UK require a minimum of three or four years' attendance. The main difference is whether or not to participate in a year of placement (sandwich). It is not compulsory but students gain a lot enormously from the experience and typically, after completing their studies at university, and they are more likely to progress into high quality graduate employment (Loughborough University First Degree Destination Data (DLHE) 2011). Successful completion of a placement can lead to the additional award of a Diploma in Professional Studies (DPS). 80% of eligible Loughborough University students from industrial design course are on placement or a placement & study abroad combination in the 2015-2016 academic year. Students experienced the industry's latest information, project management as well as teamwork when participating in the company's actual project operations. The 5 universities in the UK established a wide range of cooperative relations with the well-known enterprises industry [10].The industrial design course in Chinese universities lasts four years, and there is no one-year placement for students to choose. In China, the curricula are divided into three categories from the learning form: lecture, experiment and practice [13].Taking Tongji University as an example, the total credits are 191.6, and the practical credits are only about 38 credits (not includes 16 points of graduation design credits), only 19.8%, less than the average annual credit. The proportion of practical is lower than that of the UK universities. Industrial design is an application of science, and professional practice plays a pivotal role in the development of students' comprehensive quality, including exploring the design essence, solving problems innovatively and broadening horizons [14]. The practice curriculum of Tongji University presents in two forms: project in the laboratory and placement in company [13]. Many references provide advice on industrial design education in China, that is to learn sandwich courses and to increase the proportion of practical courses.

3.5.2. Graduation Project is an Important Part

The graduation project occupies final year in the UK, but a semester in China. Graduation design projects are basically the same, while graduates of Loughborough can undertake a client-based project, a concept design project, an intensive 'design week' and a dissertation on an aspect of design. Tsinghua University graduation design transformed the technology-oriented paradigm to the human and social demands as the leading, to explore the topic of common social concern. Jiangnan University graduation design starts cross and integration design projects, including products, space environment, service systems, information and so on [11]. The difference is that the UK graduation design focuses on the possibility of mass production. China's graduation design stays in conceptual design, such as the graduation design of Loughborough University and Brunel University, which are closely linked with advanced science and technology. Students will be widely used in the work of modern intelligent technology, automatic control technology, 3D printing technology, microelectronics technology. The graduation design works are not only the design concept of the paper, but the function of final product with the internal structure complete is normal and can be used for mass production. Each piece of work has a detailed design project next to the book. Students record the design process one by one in the project book - market research, consumer analysis, design concepts, design analysis, product testing, product evaluation and final solution.

3.5.3. Integration of Technology and Design Education

Industrial design is a practical course, so it is difficult to attract students' interest simply relying on the theoretical knowledge to explain. A wealth of integration of technology and design enable students to quickly visualize the design, so as to accumulate design experience and improve design confidence. The five universities in the UK combine the basic theoretical knowledge and practice of the design effectively. The most typical characteristic of industrial design education of Brunel

University is the technology-oriented and the establishment of comprehensive innovation training system which integrated technology and design education for students to engage in the high-tech products development. The realization of this model mainly relies on a team of teachers with a wide range of disciplines, a variety of laboratory facilities where they can carry out sundry materials processing, as well as artificial intelligence curriculum system. The Brunel University's industrial design is in the Engineering and Design School, and teachers are mostly experts in engineering and technology such as mechanical, electronics, materials, computer, mathematics, psychology, and imaging, as well as designers with rich practical experience. Students of Loughborough University spend most of their time in the studio using CNC milling machines, vacuum forming machines, laser cutting machines, drilling machines, sanding machines, polishing machines, sandblasting and other equipment processing a variety of materials.

3.5.4. Extensive School - Enterprise Cooperation and Design Competitions

For 5 UK universities, the fully-fledged work placement education has developed cooperation between industry and education programmers. Work placements offer students direct industrial experience of working on 'live' design projects with some of the best companies in the world. Current destination of Loughborough includes Telegraph Media Group, Lego, Adidas, Microsoft, IBM, Diageo, SIMTech, Unilever, Kerry Foods, Puma, Hasbro, Vax and Boots Alliance who support students with year-long paid work placements. For Blunerl University, a high percentage of students choose to take advantage of long work placement and this contributes to the excellent graduate employment record of our students. The Central St Martins University works with many large companies, including Proctor & Gamble, Kodak, Body Shop, Panasonic, ICI, Coca-Cola, Samsonite, Artek, Samsung, Liberty and Absolut. Graduation project is a good opportunity for Chinese students to cooperate with enterprises, where students must complete the graduation project in the enterprise or design company, or follow the instructor to do research topics and go to the enterprise or design company to do graduate design, or follow the instructor to research the scientific project [14].

Students both in UK and China are encouraged to participate in various design competitions, and many of them have won many national and international design awards. Taking the industrial design of Zhejiang University as an example, only in 2011, industrial design students won 4 IDEA Award and 11 the red dot design award. Xi'an Jiaotong University constructed competition - oriented and project driven practice education system. They established school-enterprise cooperation, product incubation and other new models [15].

3.5.5 International Design Perspective and Deep - Seated International Exchanges

China's industrial design started relatively late, so for China, the introduction of foreign advanced industrial design concepts and methods is extremely significant. The Industrial Design Department of Tsinghua University is highly conscious of the significance of leading talent with a background of artistic and scientific knowledge and an international perspective. They can effectively integrate and innovate elements such as culture, technology, aesthetics and business. Tsinghua University selects outstanding design institutions in the design, culture, industry center of Asia, Europe, North America, and actively collaborates with internationally renowned design institutes and multinational companies in cross-cultural and interdisciplinary design education and research. Zhejiang University each year to dispatches more than 30% of students to foreign to visit or exchange, as a consequence, a favorable international education practice interactive atmosphere for the discipline precipitated an international perspective.

4. Conclusion

China's industrial design education started late than the British, but the pace of development is very fast to meet the needs of China's economic development. Industrial design education has established a unique education system and education methods in the UK and China. This paper analyzes 10 cases to compare the approaches and priorities between the two countries in industrial

design education. The different educational system has led to a difference in the capacity of the two countries to cultivate students in industrial design. China's industrial design education emphasizes general education, focusing on cultivating students' ability of design analysis, emphasizing research-based teaching system. British industrial design education focuses on the integration of design and technology, focusing on cultivating students' practical design capabilities, emphasizing the design practical teaching. British traditional "sandwich" education model to actively mobilize the enthusiasm of enterprises concerned about education, opened up a two-way flow of school-enterprise training model. The knowledge background of undergraduates leads to the deficiency combination in theory and practice of industrial design education in China. The direct reason is that the secondary school neglects design education. This requires changes in industrial design enrollment conditions, and even primary and secondary education reform. Now, China strongly draws on practical teaching methods of the British "sandwich" placement, increases the proportion of practical curriculum and actively promotes the cooperation between universities and enterprises. Similar to British students, more and more Chinese students are keen to participate in international competitions and awards, which is also effective in cultivating students' design abilities. Chinese universities attach more importance to international exchanges, actively study advanced industrial design education concepts of developed countries and promote the development of domestic industrial design education.

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