
The Sociological Rationale of the Industrial Design Curriculum

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This study seeks to explore and define the rationale of the industrial design curriculum in terms of culture and sociology. The academic approach that relates to the rationale of instructional strategy and curricular design is the subject of discussion in this paper. The nature and characteristics of industrial design curriculum include uniqueness, experimentation, applicability, progression, economisation and socialisation. It also has to have both a local and global view in order to satisfy various standards and requirements of the market. There exist four main domains including social structure, social change, social problem and social process. Based on the essence of these four sociological domains, the authors believe certain institutions' industrial design curriculum can be greatly improved.

INTRODUCTION

Curriculum is an artificial production. In order to meet the requirements of social change, to face challenges and to entertain the needs of curricular designers and users, it is necessary that it be modified. However, curriculum change is the cultural production of human society, no matter if the factors come from social change, political revolution, economic transformation, improvement of knowledge, or the re-evaluation of existing curriculum and instruction [1].

Education is a process that conserves and transmits culture, reconstructs society, and allows the socialisation of individuals in terms of sociology [2]. That is to say, the social meaning of curriculum is to transmit the norms, values, traditions and beliefs of the society or other societies [1].

The curriculum of industrial design has a close relationship with culture and society due to its nature of generalisation and diversification. This paper tackles the topic of social design, which helps to recognise the relationship between the truthful meanings of design and human welfare [3]. As such, the approach

of the industrial design rationale is an essential topic in terms of culture and sociology.

CONCEPT AND CHARACTER OF INDUSTRIAL DESIGN EDUCATION

The idea of industrial design was first evolved in Great Britain in the mid 19th Century [4]. William Morris's *arts and crafts* movement, which emphasised the harmony of art and technology, was the foundation of the essential nature of modern design. The formal design educational system was nowhere to be found until the early 20th Century. In 1919, the German architect, Walter Gropius in Weimar, Germany, established the first design school, das Staatliches Bauhaus. At the Bauhaus school, arts and technology were first combined in its curriculum [5].

The study of IACP (Industrial Arts Curriculum Project) claims that human knowledge can be classified into four categories of knowledge, namely:

- Descriptive;
- Normal;
- Formal;
- Practical [6].

The knowledge of industrial design primarily belongs to practical knowledge [5]. Currently, many

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industrial design schools provide a foundational course in design. However, each school emphasises different principles of design education, such as form and aesthetics, problem solving and CAID (Computer-Aided Industrial Design) etc [5]. Nevertheless, the common nature and characteristics of industrial design curriculum can be identified.

Uniqueness

The philosophy of the curriculum is its emphasis on the study of differentiation and uniqueness. The element of creativity is an essential part amongst several different disciplines. Nevertheless, in comparison with others, industrial design emphasises more on inspiring the creativity of students in the curricular design.

The main value of design is to provide unique and creative solutions by using the design technique and knowledge. The definition of creativity can be described as *a small effort, but a big harvest*. In order to achieve this objective, the curricular design shall be tailored to meet users' requirements. The nature of creativity is to overthrow the traditional concepts and cognition. Therefore, both change and uniqueness are crucial elements in the design process.

Experimentation

The experimental processes are stressed during the studio course, which includes product planning, idea sketching, user testing, prototyping, etc. All these design processes are experiential and require direct student participation in the testing. The curricular design encourages the students to take on problems and create reasonable solutions to the problems. Problem-based learning is one of the important teaching methods in the education.

Applicability

The industrial design discipline combines several subjects, which include aesthetics, engineering, economical concepts and socio-cultural study. Therefore, the main objective of the curricula design is utilising the knowledge synthetically and eventually generating creative proposals. The students have to learn how to design proper products under the limitations of manufacture, ergonomics and market requirements by applying the knowledge that they learn from these subjects.

Progression

The principal objective of industrial design curriculum is to provide a better quality of life. In addition, the

philosophy behind industrial design certainly believes that the value and meaning of design is to improve the material culture by offering better solutions. Most design philosophies emphasise the development of knowledge. By contrast, the perennial concept and knowledge is being challenged. This is due to the nature of the curriculum, which is to encourage students to deal with change. Logically, the newer generation of products has to be better than the older one.

Economisation

One significant difference between art and design is that the design discipline has to meet the limitations and needs of economical production and the market requirement. Thus, industrial design curriculum has to have the virtue of economisation.

In the educational system, it is crucial to teach students to be able to deal with the knowledge and how to balance and compromise between the limitations and needs amongst several subjects. This is why industrial design is often characterised as having to *compromise art or philosophy*, while at the same time being an important philosophy of the curricula design.

Socialisation

Most end users of industrial products are humans. Hence, human cognition and mental models play a vital role in affecting the trend of industrial design discipline. Curricular design cannot be achieved without taking the factors of the socio-culture into consideration. This is mostly due to the user's needs coming from the background and socio-culture of daily life. Thus, a successful product design is closely associated with the degrees of socialisation

Local and Global View

An industrial product is designed to satisfy the needs of people's daily lives. Such material culture surrounds us all the time. The relationship between humans and the manufactured environment is so intimate that the needs of various industrial products is often reflected in the curricula design. On the other hand, due to the development of efficient manufacturing and marketing channels, industrial products have had higher mobility than arts or crafts. Moreover, in order to meet the standards and the requirements of different markets, it is necessary to include the local and global view in designing the curriculum.

The discussion below describes the social aspects of industrial design in terms of analytic, hermeneutic and critical methods.

SOCIAL STRUCTURE

The definition of the social structure can be stated as follows: the interrelationship of different positions and roles that exists in a society or other groups and is the so-called *pattern*, which builds a very steady social relationship [2]. Some factors related to the design curriculum in terms of sociology are listed below.

Social Structure and Curriculum

Education has an enormous impact on the mobility of social class. A child who comes from an upper class family may not be well educated and step down to a lower class. By contrast, a lower class child may, due to being well-educated, enter into a higher class [2].

The curriculum of industrial design is intended to provide its knowledge to serve the people of the general class. One important philosophy in industrial design is to provide good merchandise and reasonable prices compared with those of the ancient era when the products served the normal class mostly. This is the spirit of the arts and crafts movement and Bauhaus, which emphasises the harmony of arts and technology [4]. Therefore, curriculum cannot only provide the knowledge and awareness to design luxury goods, but also concerns the quality of the goods for the weaker groups, such as the elderly, youths, and physically disabled people. Thus, the modern industrial design curriculum has to balance the development of main and weaker classes. Healthy social mobility is one crucial sign of social improvement.

Figure 1 shows a unique pull-up hot water switch placed in the left hand side of the heater (the opposite of conventional operation) and would be too difficult for children to operate and thus reduce the risk of children being scalded. In addition, the protective screen creates a hurdle from the control panel being manipulated by children. A simple design technique can reduce the accidental occurrence to a significant level.

Social Intelligence Structure and Curriculum

Curricular design must adapt to the differentiation of individual students. The selection and arrangement of a curriculum has to be flexible [2]. It is a concern that the contents of the curriculum have to meet the individual interests and abilities of students. However, it is a tough decision between the insistence of curricular philosophy and the satisfaction of individual interests.

In addition, the tutor has to provide different



Figure 1: Example of a design technique to improve safety (designed by W-J. Cheng).

instructional strategies to entertain the needs of individual students. That is to say, the curriculum has to be concerned with the nature of the intelligence structure of individual students.

Social Institutions and Curriculum

The two main institutions of social structure related to the curriculum contain political and economical aspects [2]. Hutchins said that in terms of politics, the educational system reflects on the political community. Although, the curriculum of industrial design is closer to the people's livelihood, the political issues still effect the development of industrial design education. The Bauhaus school is the obvious evidence [4]. In a sense, political issues affect the development of design education; design education reflects the reality of politics.

Secondly, economic issues dominate the trend of design activity. It is understood that the purpose of industrial design curriculum is to provide the concepts and skills of living in terms of economics. Therefore, the curriculum emphasises the law of demand and supply, that is to say, the curriculum provides the knowledge for designing *goods* with reasonable prices to satisfy with the needs of consumers.

Culture and Curriculum

There is a bilateral relationship between education and culture. In other words, culture may affect education,

and education also may affect culture. Therefore, education is the production of culture, and also the result of culture [2]. The cultural meaning of the design curriculum is based on the results of human behaviour. The design process not only intends to offer the concrete product but also to respect the beliefs, attitudes, customs, values and morals of people.

Once again, the curriculum of design has to be aware of the proper attitude toward the dominant and weak culture. In a sense, culture is the spirit of artificial goods. Without the concern of cultural factors, the goods cannot succeed in the market. Intercultural corporation is an especially new trend in design activity, owing to the influence of the global village ideology.

SOCIAL CHANGE

Social change means the model transition of human behaviours and values on social life [2]. The curriculum of industrial design is designed to face the change, owing to its philosophy of progressivism. The concerning factors of design activity include population, gender, family structure, social custom, and social organisation [2]. The change of these factors has a significant impact on the course.

The amount of knowledge is increasing to double the size of only few years ago. The knowledge of design has also changed rapidly and, although some basic principles still remain unchanged, the tools and concepts of design have been changed over a short period, especially regarding computing and fashion. Such developments of technology and changes of social structure have dramatically impacted the design of the curriculum.

If one takes a close look at the transition from machine to information era, the concepts and procedures of design activity had been changed rapidly. Therefore, the reform of technology is one of the crucial reasons of social change. A dynamic curriculum of industrial design or cluster curriculum to meet the characteristics of social change seems to present its meanings to the curricular designers.

SOCIAL PROBLEMS

The statement that *design is used to solve problems* is one of the most important concepts of design. Therefore, addressing social problems is a crucial aspect of the design activity. All of the social problems are potential problems to the design discipline, such as environmental issues and problems of violence. The ecological awareness of the public increases the

concern of design discipline on the issue. The concept and skills of *green* design have attracted much attention from the designers. It becomes an essential element of design and manufacturing.

Furthermore, because the nature of socio-culture is concerned with the problem of public security; violence problems have to be taken into account during the design processes. A simple technique of design can contribute to solving big social problems.

Figure 2 shows how a proper use of materials and design technique can solve violence problems. A litter unit designed against vandalism also matches the form of the nearby Chillon Castle in Montreux, Switzerland.

The examples cited above demonstrate the interaction of social problems and design activity. Some hidden problems, such as psychological and gender issues are also crucial problems to the design discipline. Therefore, the interdisciplinary and problem-solving approach has to be taken into account when designing the curriculum of industrial design. The design scenario can be a vital activity on the instructional programme.

SOCIAL PROCESS

Professor Huang pointed out that the meaning of social process is dubbed *socialisation*, which is the result of interaction between individuals and groups. In other words, it is the process that the individual accepts the social norm [2]. Design curriculum is used to evoke a sense of social values and a model of behaviour from the students. It is understood that the curriculum has to provide this knowledge.

By using the techniques and concepts of design a better material environment and culture can be

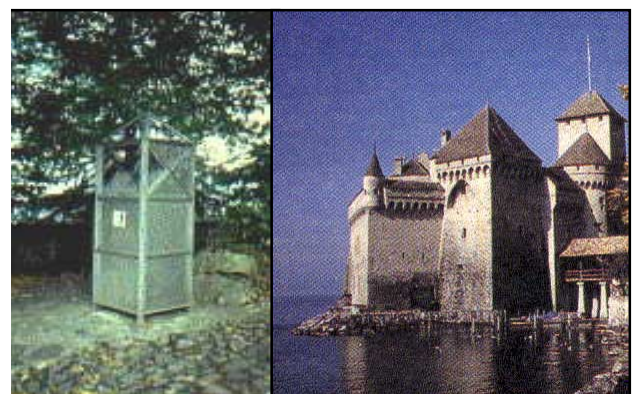


Figure 2: A design against vandalism for a litter unit (left) stands in harmony with the nearby Chillon Castle (right) in Switzerland (photo by W-J. Cheng).

achieved. For example, the domestic products need to be concerned with the interests of particular groups, such as elders and youngsters. In addition, a well-designed computer is a great help to physically disabled people in terms of absorbing new knowledge.

Design curriculum is dedicated to allowing physically disabled people to achieve the first step of socialisation and interaction with other people. The curriculum is designed not only to help students realise the social values and norm, but also to extend its effects to different groups. Thus, social mobility can be ensured and a healthy interaction amongst people can occur.

Table 1 gives an overview of the sociological rationale of the industrial design curriculum. In terms of sociology, the curriculum of industrial design is the production of social interaction. Design philosophy, which concerns different groups in society, also plays a part.

The discipline of industrial design has to achieve the ability to solve social problems. Furthermore, the accumulation of knowledge is equal to the degree and quality of social problems solved. The curriculum provides the capital of social mobility for its students and avoids social reproduction occurring internally. Moreover, because of concern for different groups, the curriculum can also avoid the effect of the correspondence principle.

RECOMMENDATIONS

From the above statements, the cultural and sociological rationale of industrial design has been discussed in terms of social structure, change, problem and process. The effect of socio-culture has a stronger influence on the design curriculum than the influence of design on the society. Having said that, it is worth considering the social responsibility of the design curriculum to the society.

The recommendations for design curriculum can be described as follows:

- The curriculum of industrial design has to be designed in order to meet the requirements of these social phenomena due to its socio-cultural contents. In short, the curriculum is a production of social reflection.
- The design discipline is a social tool that is used to solve social problems. It is a social force on improving the progression of the society. The progression of knowledge is dependent on the degree and quality of the solution.
- The purpose of the design curriculum is to prompt

social mobility but to avoid social reproduction throughout the educational system [7]. That is to say, the role of the design curriculum is to balance the development of different groups, which includes the groups of weaker or culturally disadvantaged. Therefore, the correspondence principle can be avoided throughout a proper curricular design.

- The aim of design education is not only to provide social knowledge to the students, but also for them learn how to use design techniques to express their social concerns. The discipline is linked to social dynamics; hence, the design curriculum is the so-called *dynamics* of social design.

SUMMARY

The discipline of industrial design belongs to the subject of social science in terms of material culture. Therefore, it is understood that the rationale of socio-culture is an essential element to curricular design.

The ultimate goal of the design curriculum is to use design concepts and techniques to educate the student and to have the people become socialised. The interaction between these social phenomena are intimate. Hence, a macro and micro view towards the social issues is a precise direction for approaching the cultural and sociological rationale of the industrial design curriculum.

It can be concluded from this study that the curriculum of industrial design is a truthful reflection of social reality.

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BIOGRAPHIES



Wen-Jun Cheng received his MA degree in industrial design from the University of Central England in Birmingham, England, UK, in 1992. He received his PhD degree in industrial education from the National Changhua University of Education in Changhua, Taiwan, in 2001.

Having majors in both design and education, his current research interests include the influence of ideology and hegemony on the arts and design education in Taiwan. He is also interested in design practice related to the fields of living goods and information products.



Chuen-Wen Liao received his PhD degree in education from the National Taiwan Normal University, in Taipei, Taiwan, in 1991. After graduating, he then joined one of the faculties at the National Taichung Teachers College, located in Taichung, Taiwan. From 1997 to 2000, he was

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Since 2000, he has been Chairman of the Graduate Institute of Elementary Education at the National Taichung Teachers College. Professor Liao has also established himself as one of the important leaders in elementary education in Taiwan

Table 1: Overview of the sociological rationale of the industrial design curriculum.

Related domain	Viewpoint and assumptions	Sociological rationale of industrial design curriculum
Social structure: 1. Hierarchical structure	Viewpoint: The social mobility of the hierarchy is affected by education. Assumption: Turner creates the concept of sponsored mobility and content mobility. Grammar school emphasises symbolic value, whereas vocational school emphasises functional value.	Industrial design curriculum should emphasise thought and logical exercises while industrial design technology curriculum should emphasise practical techniques and adaptation for a job. Industrial design curriculum includes mainly technology and aesthetics. The designed products must match the requirements of mass production and the significant differentiation between art and design. Therefore, the curriculum leans to an orientation of practical value. The curriculum and instruction has to consider physically disabled people in terms of user group.
Social structure: 2. Intelligent structure	Viewpoint: The curriculum and instruction has to reflect the fact that people in social groups represent a normal distribution and have a mid-level intelligence. Assumption: In order to adapt to different individuals, the selection of curriculum has to be designed and arranged with flexibility.	Curriculum contents have to meet the different requirements of individuals and inspire student interest throughout the contents of instruction. Instructional strategies have to satisfy the needs of individual students.
Social structure: 3. Social institution	Viewpoint: Members from different societies are recognised as playing different expected roles in terms of their nature of social institution. Assumption: In terms of political institutions, the educational system is used to reflect on the issues prompted by the political community. In terms of economical institutions, the goal of education is to emphasise developing skills in economics for individual students.	Curricula design should reflect the truth of political society. Therefore, the reform of political society can be expected. The curriculum and instruction should foster the capability for designing commercial goods.

Table 1 (ctd): Overview of the sociological rationale of the industrial design curriculum.

Related domain	Viewpoint and assumptions	Sociological rationale of industrial design curriculum
Social structure: 4. Social culture	<p>Viewpoint: Culture affects education and vice versa. Education is the production and motivation of culture.</p> <p>Assumption: Curriculum is the essential culture that is selected for a particular learner.</p>	<p>The curriculum design of industrial design should inspire students to recognise the factors of culture and incorporate the philosophy of product design.</p> <p>The selection of curricular contents should balance the viewpoint of both local and global culture and respect different cultural values and beliefs.</p>
Social change	<p>Viewpoint: People's lifestyles have been changing dramatically, including behaviour, social organisation, relationships and customs.</p> <p>Assumption: The phenomena of social change indicates that the social structure is cannot meet social needs or conflicts between different kinds of culture. As such, the curriculum designer has to take these factors into consideration.</p>	<p>The goals of curriculum design have to meet changes in society and new developments in technology.</p> <p>The nature of industrial design is creation and improvement; hence, the curriculum design should teach students how to encounter lifestyle change.</p>
Social problems	<p>Viewpoint: The majority members of society are responsible for various social problems. Therefore, the members should solve these social problems collectively.</p> <p>Assumption: Social problems are the cause of social dismissing, conflict of values and bias in individual behaviour.</p>	<p>Industrial curriculum design should encourage students to observe solutions to social problems, eg vandalism, social security, etc. Design philosophy is being used to solve social problems in terms of sociology.</p> <p>The curriculum serves as a tool to cultivate the student as a curer of pathology in terms of sociology.</p>
Social process	<p>Viewpoint: The social process means socialisation and related social processes; it is the result of interaction between individual and group, and the socialisation of the individual.</p> <p>Assumption: Different societies exhibit different models of social behaviour; individual members should learn the model in which he/she exists.</p>	

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Participants from over 20 countries came together at the University of Sydney, Australia, between 4 and 7 July 1999, for the 2nd *Asia-Pacific Forum on Engineering and Technology Education*. Issues debated included those of globalisation, specifically the impact of globalisation on engineering and technology education; the impact of, and responses to, rapidly changing technology and production processes; and the status, quality and importance of engineering and technology education, all of the above in the context of recent economic difficulties in the Asia-Pacific region.

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