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INVESTIGATING THE ADVANTAGES AND DISADVANTAGES OF TAIWAN'S INDUSTRIAL DESIGN EDUCATION FROM DEPARTMENT EVALUATION DATA

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Abstract. With Taipei being nominated for the World Design Capital 2016, an event that emphasize “design thinking,” issues such as identifying Taiwan’s design education development trends and crucial factors influencing Taiwan’s design industry development must be addressed for Taiwan’s future design education. This study conducted a pilot study to investigate design department objectives, analysed designer abilities required by businesses, and referred to the design department evaluations. The results showed that for industrial design departments, issues that required most improvements were: (a) concerning those to better implement self-improvement mechanisms so that course learning objectives are adjusted to meet business expectations; and (b) Space and equipment should be upgraded. In addition to the upgrade, the actual requirements of the enterprise should be consulted for planning. In addition to making such changes, design departments should plan design education according to the actual requirements of businesses. The results of this study may be used as reference when engaging in department planning for the development of industrial design education in Taiwan.

1. Introduction

Taiwan’s higher design education originated in 1964, the year when the Ming Chi Institute of Technology (current Ming Chi University of Technology) introduced the industrial design program. A period of five decades has passed since 1964, during which “design” has shown a clear intangible influence on Taiwan’s economic development as well as various sectors such as national competitiveness and people’s livelihood. A review of Taiwan’s design education in practice shows significant developments. In fact, Ph.D. programs in design were further added in 2000 [1].

Under this premise, this study investigated the current situation and problems concerning the development of higher design education in Taiwan by analyzing the evaluation contents produced by various schools. The development of industrial design education was further explored by examining the educational objectives of design departments, and evaluation analyses. The analysis results are shown below.



2. Target Abilities Set by Design Department and Abilities that Business Expected from Industrial Designers

According to data compiled by the Statistics Department of Taiwan's Ministry of Education, the number of graduates from design-related departments in Taiwan amounts to more than 5,000 students per year. Similarly, students studying in undergraduate design-related courses such as visual communication design, product design, and interior design increased from over 30,000 during the 2007–2008 academic year to more than 40,000 during the 2010–2011 academic year, showing an increase of 40%. The number and quality of students graduating from such design departments have a direct effect on whether the personnel requirements of related industries can be satisfied as well as Taiwan's overall national competitiveness.

Previous design education mainly focused on practical training. The demands of related industries for designers were also relatively simple. However, as the overall environment evolved, the requirements diversified. Norman [2] proposed different views pertaining to future design education. For designers, they must not only possess the necessary professional skills, but also deal with work-related issues such as company organizational structure, social issues, interpersonal relationships, and service and design experiences. Following the government's policies to promote the cultural and creative industry, colleges and universities established related departments. However, whether the knowledge and skills taught in schools are able to meet current or future industry needs is an issue worthy of investigation. Therefore, we conducted a pilot study to investigate schools' objectives for founding cultural and creative design-related departments to assess students' acquisition of skills from higher education. The analysis results are shown below.

2.1. Analysis of the Objectives for Founding Design-Related Departments

Currently, design-related departments in Taiwan total more than 200. Competition between design schools remains fierce and schools are engaging in specialization and differentiation-related efforts to distinguish themselves from competition. Thus, an analysis of the objectives set by the departments as well as their unique characteristics will provide insight into the current trends in the abilities of designers under the new cultural and creative environment. For the first stage of the analysis, this study used a sample of 28 creative design-related departments. Such departments' name were divided into seven orientations or types: cultural vocation development, cultural and creative industry, cultural and creative industries management, cultural creativity and design, creative and digital media design, creative design, and others.

By combining the educational objectives of the 28 departments, we obtained a total of 49 ability items. Next, we separated these ability items into different groups and found that the abilities could be roughly divided into seven categories, which were "comprehensive abilities," "theory-based abilities," "digital technology-related abilities," "practical abilities," "property rights knowledge," "interior design abilities," and "marketing and management abilities." The top three most frequently mentioned abilities were "practical abilities," "marketing-based planning and management abilities," and "creative thinking abilities and cultural literacy." The analysis also showed that the focus of education differed between the seven department types, which are listed as follows: cultural vocation development departments focused on cultural literacy; cultural and creative industry departments emphasized on operational management; cultural and creative industry management departments paid attention to marketing-based planning and operational management; cultural creativity and design departments stressed the importance of theories, cultural literacy, and art literacy; digital media design departments focused on interdisciplinary integration abilities, digital technology-related abilities, and marketing-based planning; and creative design and lifestyle departments emphasized "creative thinking abilities," "product development," and "exhibition activity-based designs" (Table 1).

The 49 abilities were also divided into seven categories, of which comprehensive ability-related learning accounted for the highest percentage (i.e., 24.24%), followed by theoretical foundation ability-related learning (i.e., 22.44%) and digital technology ability-related learning (i.e., 16.32%). The results showed that these three abilities were the key abilities to be developed (Figure 1) [3].

An analysis of the educational objectives shows that cultural and creative design-related departments focused on practical abilities, marketing-based planning abilities, management abilities, creative thinking abilities, and cultural literacy as the key abilities to be developed. Concerning other departments, indicators for abilities to be developed also differed. Such ability indicators signified future abilities of the students. Therefore, whether these abilities meet the needs of employers is a topic worthy of further investigation.

Table 1. Key Abilities to be Learned According to Each Respective Department

Department types	Focus of education
cultural vocation development	cultural literacy
cultural and creative industry	operational management
cultural and creative industry management	marketing-based planning and operational management
cultural creativity and design	theories, cultural literacy, and art literacy
creative and digital media design	insufficient data for analysis due to low number of departments
creative design	
others	

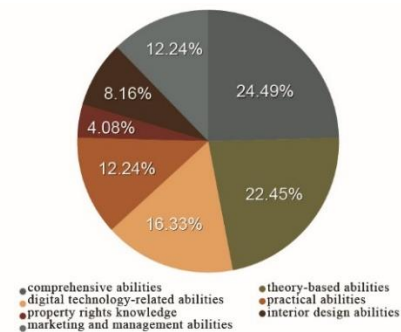


Figure 1. Abilities to be Learned as A Percentage of All the Abilities

2.2. Examining the Problems of the Current Era via Higher Education Evaluation

Taiwan's higher education evaluation has changed over time. Related evaluation systems have evolved from general school evaluation to professional education evaluation [4]. Most department evaluations in the second-stage further emphasized assessing students' learning results [5].

The Taiwan Ministry of Education has set clear targets for the two stages of higher education evaluation, in which the goals for the first-stage and second-stage department evaluations were to "ensure that students are provided a high-quality learning environment" and "promote and implement mechanisms ensuring favorable student learning results," respectively. The two-stage evaluation targets show how expectations and values of education have changed over time. In addition to the problem of sub-replacement fertility, imbalanced education quality, poor resource allocation, and globalization of education markets, challenges related to talent issues in the market has resulted in higher education resources becoming overly dispersed, defeating the intentions of the government when it rapidly increased the number of universities. The oversupply of education has led to incessant higher education crises and related problems such as low college and university competitiveness, low student enrollment rates, and poor student qualities [5].

Mechanisms to ensure the learning results of students were introduced to guide the abilities of students, emphasizing what they had learned and were capable of doing. The rapid increase in the number of universities resulted in poor student quality and the gap between students trained by schools and professional personnel required by businesses. Such an issue is a clear social problem and one that potentially jeopardizes national competitiveness.

3. Current Situation of Design Education Following Department Evaluations

This study first explored current situations and problems of higher industrial design education. Next, the advantages and disadvantages of Taiwan's current industrial design education were analyzed using evaluation content obtained by the Higher Education Evaluation & Accreditation Council of Taiwan and the Taiwan Assessment and Evaluation Association.

3.1. Sample Used for Industrial Design Evaluation and Analyses

This study selected only industrial design departments as the study sample and used department evaluation reports issued by evaluation centers on their websites as the basis of analyses. By searching through the online database of the evaluation centers, we obtained the evaluation data of six general university industrial design departments and four technical and vocational university industrial design departments. The evaluation and analysis sample thus comprised 10 university industrial design departments (Table 2).

Table 2. Sample of industrial design departments selected for evaluation and analysis

General Universities		Technical and Vocational Universities	
School	Department	School	Department
Tatung University	Department of Industrial Design	Ming Chi University of Technology	Department of Industrial Design
Dayeh University		Yunlin University of Technology	
Tunghai University		Taipei University of Technology	
Chang Gung University		Chaoyahg University of Technology	
Cheng Kung University			
Huafan University			

3.2. Evaluation of the Advantages and Disadvantages of General University Industrial Design Departments

Analysis showed that the primary advantages of general universities are as follows: characteristics developed by departments matched the education philosophies of the school. The long-term class teacher or mentor systems enabled teachers to fully understand students' personal characteristics. In addition, interdisciplinary development strategies could be adopted for resource integration, and joint work with the professional industry facilitated in finding cooperative education opportunities. Conversely, the disadvantages of general universities are listed below: curriculum planning and teacher expertise were unable to meet school's educational objectives; and lack of a systematic course plan, in which courses to be studied for each respective industry remained unclear. The advantages and disadvantages were compared and compiled into Table 3. Four items (emboldened in the table) featuring both advantages and disadvantages were: (1) the teacher and senior student guidance system helped guide junior students in making course selections. However, systematic course plans indicating courses to be studied for each respective industry were not available, indicating a need for improvement; (2) although the educational space and facilities were sufficient for learning, they were insufficient for meeting the departments' needs and educational objectives. To identify the reasons contributing to such problems, the departments' educational objectives and course directions must first be examined; (3) most departments were able to continue offering self-improvement courses. However, various self-evaluation mechanisms were ineffective; and (4) although alumni clubs were founded, they operated poorly and were thus unable to provide recommendations to departments for students' future developments.

3.3. Evaluation of the Advantages and Disadvantages of Technical and Vocational University Industrial Design Departments

The advantages of technical and vocational universities are as follows: teachers possessed practical and research experiences; teachers from the professional industry were employed, elevating academia-industrial connections; teachers possessed practical experiences that helped students connect with the professional industry; course syllabi were promptly uploaded online; multipurpose studios were established; and interdisciplinary counseling mechanisms and dual-class teacher/mentor systems were in place. Conversely, the disadvantages of technical and vocational universities are listed below: some classrooms failed to meet educational objectives and classroom F had to be done; inadequate employment of equipment maintenance personnel was observed; facilities were supervised by the school-level management, making usage inconvenient for departments; and computer and other equipment were insufficient in design workshops.

The advantages and disadvantages were compared and compiled into Table 4. Three items (emboldened in the table) featuring both advantages and disadvantages were: (1) complete

management guidelines and systems for specialized classrooms were enforced. However, some classrooms failed to meet educational objectives and classroom replanning had to be done; (2) the schools supplied departments with sufficient funding and equipment. However, computer and other equipment were insufficient in design workshops, indicating the need for improved funding allocation; and (3) departments possessed interdisciplinary counseling mechanisms. However, no interdisciplinary learning mechanisms were in place to meet students' diverse learning demands.

3.4. Cross Analysis of the Advantages and Disadvantages Listed in the Industrial Design Department Evaluation Results of Both General Universities and Technical and Vocational Universities

By performing a cross analysis on the industrial design department evaluation results of both general universities and technical and vocational universities, this study identified the advantages of industrial design education in Taiwan, which are listed as follows: (1) students are successfully motivated to participate in design-related competitions; and (2) high ratio of graduates being employed. Conversely, the disadvantages of industrial design education in Taiwan are as follows: (1) improvements remain to be made in educational space and facilities; and (2) alumni club operation is inadequate and unable to facilitate department development.

Table 3. Evaluation of the advantages and disadvantages of general university industrial design departments

Item	Evaluation content of general university industrial design departments (advantages)	Evaluation content of general university industrial design departments (disadvantages)
Departments	Objectives	Clearly matched departments' educational objectives Questionnaire surveys completed by graduating students showed high satisfaction, meeting departments' educational objectives
	Characteristics	Characteristics developed by departments matched the education philosophies of the school
		Long-term class teacher and mentor systems enabled teachers to fully understand students' personal characteristics
		Interdisciplinary development strategies were adopted for resource integration
Education	Performance of school graduates	Worked with the professional industry to obtain cooperative education opportunities Performance of graduate students earned the recognition of their employers
	Research	Research projects that received funding from the Ministry of Science and Technology showed outstanding results
		Research projects and essays were completed by the same small group of teachers
		Various teacher rewards were set up as incentives to elevate their professional performance
	Evaluation	Departments' research-related planning matched teachers' expertise and department development
		Employed education evaluation systems through the use of online resources to reflect students' learning statuses
		Education evaluation systems were built
	Activities	Hosted international exchanges and seminars as well as related activities
		Teachers and students actively participated in intracurricular and extracurricular activities (research competitions and exhibitions)
	Courses	Teacher and senior student guidance system helped and guided junior students in making course selections Curriculum planning and teacher expertise unable to meet schools' educational objectives
Development of abilities	Education	Core curriculum failed to meet educational objectives
		Lack of a systematic course plan, in which courses to be studied for each respective industry was unclear
	Facilities	Teachers' expertise failed to match courses and department development
	Self-improvement	Educational space and facilities were insufficient for meeting the departments' needs and educational objectives
Students	Situation after graduation	Self-evaluation improvement for courses were in place
		Self-evaluation mechanisms were ineffective
	Alumni clubs	Curriculum committee operated favorably Surveys on the employment or further education status of school graduates were missing
		Most graduate students worked in design-related jobs
		Alumni tracking systems (alumni clubs) were founded
		Alumni clubs operated poorly, failing to provide recommendations to departments concerning students' future developments

Table 4. Evaluation of the advantages and disadvantages of technical and vocational university industrial design departments

Item		Evaluation of technical and vocational university industrial design departments (advantages)	Evaluation of technical and vocational university industrial design departments (disadvantages)
Departments	Objectives	Curriculum matched the needs of Taiwanese industries as well as international development trends	Educational objectives were unclear and students were trained only for limited fields
	Characteristics	General and professional knowledge and abilities were stipulated for graduating students (i.e., prerequisite for graduation)	
		Local characteristics developed and linked with the professional industry	
Education	Research	Number of teacher-conducted research increased	Low ratio of professor-level teachers Poor technology transfer
	Activities	Students' participation in design competitions showed great results	
	Courses	Promotion of comprehensive planning and learning portfolios in place	
		Courses matched students' career and professional developments	
	Education	Full-time teachers possessed favorable practical and research experiences	Insufficient number of teachers with a background in culture-related fields
		Part-time teachers from the professional industry hired to enhance academia-industrial exchanges	
		Course syllabus promptly uploaded online for students to check and learn	
		Interdisciplinary counseling mechanisms in place	Lack of interdisciplinary learning mechanisms to meet students' diverse learning demands
		Education based on multipurpose studios displayed concrete results	
		Teachers possessed practical experiences that helped students to connect with the professional industry	
		Dual-class teacher/mentor systems in place	
	Facilities	Complete management guidelines and systems for specialized classrooms were enforced	Some classrooms failed to meet educational objectives and classroom replanning had to be done
		A wealth of resources in libraries that helped students with their needs	Facilities were supervised by the school-level management, making usage inconvenient for departments
		Schools supplied departments with sufficient funding and equipment	Lack of computer and other equipment in design workshops Inadequate equipment maintenance personnel
Development of abilities	Self-improvement	Excellent department committee operation	
		Improvements were made according to recommendations made from previous visits	
		Regular teacher conference systems were in effect	
Students	Internship system	Comprehensive internship guidance system in place for off-campus internships	
	Situation after graduation	High ratio of graduates being employed	Lack of alumni follow up systems and personnel for long-term student status follow-up

4. Conclusion

Analyses of the industrial design departments of general and technical and vocational universities showed that compared with the industrial design departments of technical and vocational universities, those of general universities featured superior research potential and evaluation mechanisms. Conversely, industrial design departments of technical and vocational universities displayed more favorable education. In other words, the former better met the department evaluation expectations in research potential and evaluation mechanisms, whereas the latter better met business expectations in education. The analysis also proposed more suggestions in the area of education for general universities, showing that general universities required more improvements in such area.

General universities placed their focus on using ability indicators and considering abilities needed by industries in making course planning-related adjustments. Conversely, technical and vocational universities emphasized that teachers possess practical experiences and provide comprehensive learning portfolios to guide students' learning; most of the departments provided students with learning portfolios to help them select courses and attached great importance to related performance and competitions. However, alumni clubs operated poorly and were unable to provide department with resources effectively. In addition, education space and facilities were inadequate, preventing the departments from enhancing their education-related special features to improve their competitiveness.

The analysis results are cross-analyzed with the goals of the Design Department, business surveys, and evaluation results, in which the results showed that for industrial design departments, the areas requiring most improvements were: (a) to better implement self-improvement mechanisms so that course learning objectives are better adjusted to meet business expectations; and (b) to upgrade design education space and facilities. In addition to making such changes, design departments should plan design education according to the actual needs of businesses. The results of this study may be used as reference when engaging in department planning for the development of industrial design education in Taiwan. Taipei is successful bid to host the 2016 World Design Capital, the spirit of main "Adaptive City- Design in Motion," that emphasized Taipei is a continuous improvement city, that related studies on design education and promotion are indispensable. This study should have an era representative and looking forward to providing the planning and development of recommendations for education of industrial design department in Taiwan.

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