

Constructing a Model of Internet-Based Career Information System for Industrial Design Students in Universities

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Abstract. This study aims to propose a model of Industrial Design Career Information System (IDCIS) to help ID students plan their career. The study was divided into three stages. The content analysis of nine relevant websites framed a basic structure of IDCIS. Next, four focus groups with a total of twenty-four ID students were interviewed to find out what career information they would like to know. Finally, a web-based model of IDCIS was simulated and eight ID students were invited to provide their feedback. The outcome would provide an integrated base to help students be aware of the ID profession and plan their career in advance during the school years. Also, the process of constructing a model of IDCIS adopted by this study could be a reference for other fields.

Keywords: Industrial Design, Career Information System, Design Education, Career Guidance.

1 Introduction

Studies show that college students demand more for the career guidance than for the academics and life guidance, especially for vocational choices and career planning [1-2]. When students make their career decisions, they need to know the information about occupations, educational institutions, training programs, potential employers, industries, family, leisure, and so on. The functions of career information acquisition include: 1) to narrow the options; 2) to help individuals to know what occupations match their values, interests, skills, family conditions, and needs for training and educational programs; 3) to understand what training plans and educational institutions are helpful to individuals before entering occupations; 4) to understand what the job objectives, industries, and employers can match individual's values, interests and skills; 5) to help individuals to prepare job interviews [3].

Following technological development, Internet-aided career guidance has been popular recently, and it can satisfy the preliminary, preventive, and repetitive career guidance needs of students in universities without time and space constraints [4]. It also would alleviate the shortage of guidance personnel in universities [5]. College students can collect online and updated career information via Internet. They also can connect to other career resources within and out of campus, which facilitate their interactions and communications with others. In addition, students do not have to go to career centers in person within the office hours for receiving career information. Therefore, students do not have to seek help face-to-face, and the cost of printed career booklets can be significantly reduced. Although the Internet may provide abundant online career information, sometimes the information comes in excessive amounts and unorganized; without effect guidance, students may waste much time on digesting the information [6-7]. Moreover, career information currently provided by most of career service websites covers as many programs and occupations as possible. Since it is necessary to consider the characteristics and specialty for individual professionals when providing career information, a career information system capable of automatically customizing career guidance for information requesters becomes important. The current study is aimed to develop such a system for ID students.

The ID profession covers various specialties, and indeed there are diverse employment opportunities in the job market for the ID graduates. However, the above information about the ID profession is not complete and presented systematically yet. The development of ID education in Taiwan has a history spanning more than forty years. Students in Taiwan spend most of their time in studying and surviving examinations, and consequently their career exploration tasks at each stage are not well developed [8]. A study shows 58% of ID students in Taiwan are acquainted with contents and future development of the ID profession when they decided to study ID [9]. In addition, ID programs in universities nowadays recruit students through different channels with various backgrounds. As a consequence, ID students may vary considerably in their abilities, aptitudes, and career goals, and they are in an urgent need of appropriate career guidance [10]. The authors have conducted a series of studies about the career guidance needs and aim to construct guidance models of ID students in universities of Taiwan. The needs of career guidance for ID students include: 1) exploration of their own aptitudes and interests; 2) a better understanding of the ID profession; 3) understanding the connections between their course work and the job requirements; 4) understanding of the match between themselves and jobs; 5) assistance in finding internship and employment; 6) knowing about advanced studies and exams; 7) learning about career planning and career decision making; and 8) providing career consultation and role models [10]. This paper is aimed to propose a model of Industrial Design Career Information System (IDCIS) for satisfying ID students' needs on career information. The outcome of this study is significant to both design education and profession. It would help students to be aware of the ID profession and plan their career in advance during the school years.

2 Research Design

The study was conducted in three stages: 1) content analysis of relevant websites; 2) focus group interviews; and 3) constructing, simulating and evaluating a model of

IDCIS. Firstly, the authors used keywords, “career guidance” and “career center”, on the Google search engine to collect and browse websites of career guidance organizations and career centers in universities. Also, in order to consider the specialty for design domain, the authors referred the contents and structures about career information provided by some official websites of ID, creative industries, and architecture communities and organizations. In other words, the authors adopted the purposive sampling method to include three types of websites: career guidance organizations, career centers in universities, and design related professions providing the concept of career development. The top 150 websites were browsed, and three of the most complete websites were selected for each category respectively.

In the final stage, the authors analyzed the contents of nine websites: 1) career guidance organizations - CareerInfoNet [11], isseek [12], Prospects.ac.uk [13]; 2) career centers in universities - FSU Career Center [14], Stanford University Career Development Center [15], NC State University Career Center [16]; 3) design related professions - IDSA [17], Architecture.com [18], Your Creative Future [19]. With regard to the process of content analysis for websites, the authors selected the websites, listed the contents for each category and item one by one, drew the framework for each website, compared the frequency for each item. Then, the authors summarized the contents and features to be included within the career information system as a basic framework for the IDCIS.

Next, four focus groups (composed by freshmen, sophomores, juniors, and seniors respectively) with a total of twenty-four ID students (11 males and 13 females) were interviewed to find out what information about ID career they would like to know. The participants were sampled for each focus group to consider the variety of gender, the entry channel to university, and backgrounds in the senior high schools. The instruments included a semi-structured outline, a tape recorder, and finally a transcript of each interview for analysis.

Then, based on analyzing the students' opinions, the authors proposed a model of IDCIS. A web-based model of IDCIS was simulated and presented, and eight ID students (four males and four females) were invited to provide their feedback to the simulated model.

3 Content Analysis of Relevant Websites

The contents and categories of each of the websites were analyzed and thereby reduced to essential function items a career information system should have. The deduced function items were further classified into five gross categories: career overview, education and training, seeking a job, resource links, and personalized functions. Table 1 shows the comparison in frequencies over the function items appearing in the websites. The functions of occupation description, information for further studies, preparing for job finding, corporate information, career planning resources, and consultation & help are most frequent. On the other hand, the information of professional training, certificate, professional activity and competition, beginning an undertaking, and international employment and education opportunities in other countries were less frequently demanded. Despite the low frequency, the demand is still significant. Because of the diversity of the nine selected websites and the variations in types of available information, all the reduced function items were held till further filtering evaluation was done.

Table 1. Comparison in frequencies over the function items in relevant websites

Type of websites Category & function items	Career guidance organizations			Career center in university			Design related professions			frequency
	a1	a2	a3	b1	b2	b3	c1	c2	c3	
Career overview										
Occupation description	●	●		●	●	●	●	●	●	8
Employment trends			●		●					2
Related occupations	●	●	●							3
Sharing of career experiences			●		●				●	3
Self-evaluation tools				●	●	●				3
Education & training										
Career development stages in university				●	●	●		●		4
Information for further studies		●	●	●	●	●	●	●		7
Career training information			●							1
Certificate information	●									1
Professional activity and competition information							●	●		2
Scholarships or other financial subsidies	●				●		●	●		4
Seeking a job										
Preparation for job finding	●		●	●	●	●		●		6
Job vacancy information		●	●	●	●					4
Corporate information	●	●	●	●	●	●		●		7
Industry information	●	●			●					3
Regional manpower information	●	●						●		3
Information for beginning an undertaking		●						●		2
Resource links										
Other professional resources				●			●	●	●	4
International employment and education information			●							1
Career planning resources	●	●	●		●	●				5
Personalized functions										
Personal skill profile	●		●	●						3
Personal career portfolio			●	●	●					3
Career chat-room			●							1
Consultation & help			●	●	●	●	●			5
Discussion forum			●				●	●		3
Job shadowing					●					1

a1: CareerInfoNet; a2: isseek; a3: Prospects.ac.uk; b1: FSU Career Center; b2: Stanford University Career Center Student Service; b3: NC State University Career Center; c1: IDSA; c2: Architecture.com; c3: Your Creative Future

The respective contents of each function items in each of the categories are described as follows. The category of *career overview* provides the students with information about various occupations as well as a mapping to a student's aptitude and available skills. The descriptive information of an occupation includes job description, graduate employment rate, related occupations, career experiences sharing, and tools for self-evaluation. The category of *education and training* provides the students with information about education opportunities provided by various channels, on- and off-campus, from the university entrance to post graduation, which includes career development tasks in the university years, graduate school information, vocational training information, professional certificate information, professional activity and competition information announcements, scholarships and other subsidies. The category of *seeking a job* provides the students with information about job selection, which includes information of preparing job hunting, job vacancies, company situations, industry situation, labor data in various regions, and the know-how of starting an enterprise. The category of *resource links* provides the students with information about professional knowledge, employment and education in other countries, and career planning. The category of *personalized functions* provides the students with information about personal skill analysis, career portfolio, career chat room, asking for consultation, discussion forum and job shadowing.

4 Constructing a Model of IDCIS

4.1 Focus Group Interviews

The main points of the results of the focus interviewing are described as follows. A total of twenty-four students in four focus groups heard about ID from different information channels. Most of the interviewed students knew little about the career opportunities in ID, or some of them had misconception of the career when entering universities, which caused significant confusion during the subsequent school years. Some interviewees later became familiar with future job orientation via experiences sharing from senior students or teachers. Some of the interviewees extrapolated possible future job opportunities mainly from what they have been learning in the department. Very few of the interviewees got to know the actual workplaces in the ID domain through attending cooperative programs with the industry or internship. What the interviewed students wanted to know the most about future jobs are the know-how of starting their own business, job contents, salary, employee qualification, and career anchor. Beside information related to future jobs, the interviewees' information needs polarize toward further studies and resources of realistic design examples.

With regard to career consultation service, the current websites already provide such service via the Internet; however, the persons who provide counseling are either teachers or career counselors. The interviewees showed a strong demand of peer consultation. Therefore, the future career information system will incorporate senior students in providing career consultation. It is also found that the interviewees hold a positive attitude toward tools of aptitude test, but the result of such tests has little influence on their career decisions. Thus, the test tools are viewed as additional resources and will not be a category.

In a nutshell, the initial contents and structure for the IDCIS, as derived from content analysis of the nine selected websites, can meet most of the needs raised by the interviewed ID students. However, the needs of learning resources and peer consultation and help cannot be satisfied by currently available websites. The authors therefore included these two services respectively in the categories of links to resources and personalized functions. The authors integrated the results from the content analysis of the websites and the focus group interviews and then proposed a preliminary structure for IDCIS, which consists of 27 function items, as shown in Figure 1.

4.2 Proposing a Model of IDCIS

In order to understand what the ID students thought about the appropriate structure of a career information system, the authors built a set of web pages simulating and expressing the initial design idea for the students to provide their feedback. The web pages were made by Dreamweaver and Photoshop software. The contents expressed within the web pages that simulating the preliminary system were retrieved by: 1) relevant information in Chinese found by the Google search engine from government, enterprise, ID related, and personal websites; and 2) information taken from the nine selected websites and translated into Chinese.

Table 2 shows the respective contents of items in each of the categories. Figure 2 is an example of the arrangement of the web pages. The content items on the second level under a category are listed on the left-hand side of the page. For this example, the category is occupation description, and therefore the items shown on the left are job description, graduate employment rate, related occupations, career experiences sharing, and tools for self-evaluation. If the job description is selected, the central portion of the page will show an introduction to an industrial designer. When another content item is selected, the information will be shown in a same fashion.

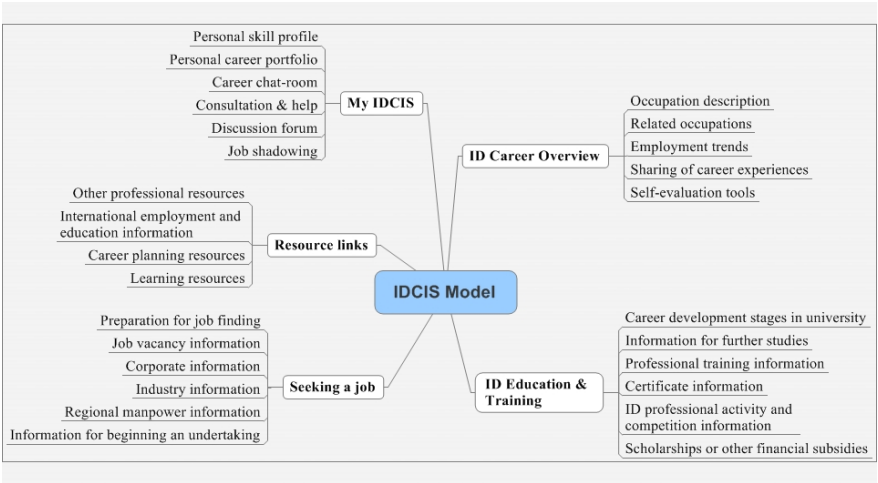


Fig.1. A structure for the model of IDCIS

4.3 Students' Feedback

The authors invited eight students, two from each grade, to provide their feedback about the model of IDCIS. Their opinions were classified into three categories: positive opinions, negative opinions, and questions/suggestions for future operation of the system.

Generally speaking, the students affirmatively supported the design concept of the IDCIS. They agreed with the idea of integrating the otherwise distributed resources of career information within a single website, which makes planning career development easy for the ID students. This is exactly what the students need with regard to their respective career planning. The function of “personal skill profile” was highly praised because the students felt it would be an effective reference for making career decisions. However, the scale meter therein was too lengthy to answer. It was also mentioned by the evaluating students that the information appeared on the web page contained too many texts, easily causing a loss of patience. This study is focused on the evaluation of items and categories of career information that meet ID students' needs. Thus, the issues of web usability and esthetics will be considered in a later stage of the system development.



Fig. 2. An example of the arrangement of the web pages

It is also found that there exist significant differences in needs of information among student groups of different grades. Therefore, in a future version of the information system, students of different grades could be provided with different categories of information. Alternatively, a hierarchy of information can be designed for displaying introductory and easily comprehensible information on the first layer; simultaneously, links to more advanced information could be displayed. Also, language translation could be an obstacle to the students with regard to reading comprehension and therefore

Table 2. The content of items in the model of IDCIS

ID Career Overview	
Occupation description	Describing ID occupation in terms of its occupation activities, job situations, work environments, aptitudes of the workers, occupation prospects, associated preparations for entering ID, in the forms of text or video.
Employment trends	Detailing employment trends of graduates, such as: employment rate, job titles, and percentage of graduates pursuing further studies.
Related occupations	Introducing other possible related occupations and their descriptions for graduates
Sharing of career experiences	Sharing of career experiences and role models by professionals.
Self-evaluation tools	Providing introduction to useful self-evaluation tools for measuring skill, interest, personality, and value systems; Providing many-to-one connection to a personal skill profile.
ID Education & Training	
Career development stages in university	Providing mechanism for organizing a statement of career development tasks of each year in the university.
Information for further studies	Providing information for further studies in domestic or foreign universities, such as information about schools, departments, admission and entrance examinations.
Professional training information	Providing course and contact information about institutions of job training programs.
Certificate information	Providing information related to certificates and licenses, such as issuing institutions, qualifications, and examination dates.
Professional activity and competition information	Posting information about professional activities and competitions.
Scholarships or other financial subsidies	Providing the application information of scholarships and other financial subsidies.
Seeking a job	
Preparation for job finding	Facilitating the preparation of curriculum vitae, job application letters, recommendation letters, portfolios, job interviews, and the construction of personal networks.
Job vacancy information	Providing access to a built-in databank of vacancies for full-time, part-time, and internships jobs, and links to web-pages of job banks and public/private organizations' recruits.
Corporate information	Providing information about employers, such as company names, persons in charge, business types, business sizes, recruiting channels, positions, job contents, recruiting qualifications, job training programs, contact information, company website links.
Industry information	Providing industry overview, strength/weakness analysis, main role in economy, job description and suggestions, employment trend, and growth rate.
Regional manpower information	Providing data of labor population, unemployment rate, average household income, per capital income, job ranking, average education, and major employers.
Information for beginning an undertaking	Providing information about available resources, regulations and legal issues, trade norm of fees, and contract specifications.
Resource links	
Other professional resources	Introducing the publication information about professional magazines and books. Providing links of professional organizations and corporate websites.
International employment and education information	Providing links to websites about general information, education, emigration, and job vacancies.
Career planning resources	Providing contact information of career service organizations, evaluation tools, and employment and education information in other countries.
Learning resources	Providing information about trends, innovative ideas, materials, technology, design tools, shops, etc. to inspire ID students.
My IDCIS	
Personal skill profile	Providing a skill measurement form for analyzing the fitness of personal skills to the job requirements of an occupation.
Personal career portfolio	Organizing personal profile, skill learning portfolio, curriculum vitae, portfolio, references and recommendation files; setting of access restriction for viewing the personal career portfolio.
Career chat-room	Providing students with instant message service for discussing with corporate staff representatives or guidance professionals about career related questions.
Consultation & help	With various practitioners, councilors, instructors, or senior students serving as career guidance volunteers, student users seek help from a selected volunteer via sending him/her an email with career questions for consultation.
Discussion forum	Providing a user-friendly platform for discussing job-related issues with text asynchronously.
Job shadowing	Applying for job projection activities and online viewing video files.

a problem that influenced the web content evaluation. Further, since there exists no professional certificate for industrial design in Taiwan yet, some interviewees suggested that the item of “certificate information” be removed.

The interviewees highly expected the actualization of the career information system in the near future; but they are also concerned with issues like: “Who will lead and maintain the development for the system?” and “Who will participate in and facilitate the project?”

5 Conclusion

ID students are looking forward to information about professional skills, design workplaces, practical training and job opportunities, advanced study, and design affairs that motivate learning; they further need a platform for consultation by professionals on issues of career planning. Neither current websites aimed at career planning guidance nor others related to ID profession can satisfy students’ needs for career development. This study proposes the idea of integrating career information of various categories in the field of industrial design at a single website, which includes occupation descriptions, further studies, job opportunities, career planning, and design resources. Moreover, the platform includes novel functions of “personal skill profile” and “personal career portfolio” for assisting the students in evaluating own professional skills and recording various skill learning processes.

This study is mainly a conceptual development of such a career information system. In the concept, the career information in the field of ID will be delivered via the Internet by ID promotional units or professional organizations to ID students in universities and senior high school students who are interested in the field. This study is focused on understanding what students think about the model of IDCIS. The students generally supported the design concept of the IDCIS. Meanwhile, they offered suggestions for improvements in web interface usability, webpage esthetics, hierarchy of information based on comprehensibility, what kind of persons should facilitate the operation of the system, and so on. Because career information covers a wide range, huge amounts of manpower and resources should be invested in the construction phase of the system. Before the operation, complete career information in the field of industrial design has to be collected, and norms necessary for self skill evaluation must be built to form a huge database. Furthermore, the function of career consultation cannot be done without the support of the professional community of industrial design. The results from the current study can be regarded as a basic system structure for assisting the ID students in their career planning. On the other hand, the research process that includes the steps of website content analysis, focus group interviews, reduction to function items and the associated user evaluation of the system may have some reference value for building career information systems in other professional fields.

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References

1. Jin, S.R., Lin, C.S., Tian, S.L.: The Career Development of Chinese College Students in Taiwan (in Chinese). *Bulletin of Educational Psychology* 22, 167–190 (1989)
2. Sie, S.W., Liao, J.M., Lin, W.S., Cai, P.J.: Choices-Seniors' Feelings about Their Career Decisions (in Chinese). *Journal of Social Science* 9, 153–182 (2001)
3. America's Career InfoNet (2006/03/11), http://www.acinet.org/acinet/exp_info.asp
4. Huang, D.S., You, S.J.: Career Guidance for Teenagers in E Generation. *The Guidance Information of High School in Taiwan* 63, 31–37 (2000)
5. Sampson Jr., J.P.: Enhancing the Use of Career Information with Computer-Assisted Career Guidance Systems. In: *The Present and Future of Computer Assisted Career Guidance Systems in Japan*. Symposium conducted at the meeting of The Japan Institute of Labor, Tokyo, Japan (1997)
6. Kirk, J.J.: Web-Assisted Career Counseling. *Journal of Employment Counseling* 37, 146–159 (2000)
7. McCarthy, C.J., Moller, N., Beard, L.M.: Suggestions for Training Students in Using the Internet for Career Counseling. *The Career Development Quarterly* 51(4), 368–382 (2003)
8. Ministry of Education Student Affairs Committee, Planning of Career Guidance for Undergraduate (in Chinese). *Student Guidance* 30, 58–69 (1994)
9. Yang, M.Y.: A Study on the Construction of Internet-Aided Career Guidance Model for Industrial Design Students in Universities (in Chinese), Unpublished Dissertation, Institute of Design at National Yunlin University of Science & Technology (2005)
10. Yang, M.Y., You, M., Chen, F.C.: A Study on the Difficulties and Career Guidance Needs of Industrial Design Students: Implications for Design Education (in Chinese). *Design Journal* 10(2), 57–76 (2005)
11. CareerInfoNet (2005/02/01), <http://www.acinet.org/acinet/default.asp>
12. isseek (2005/02/05), <http://www.iseek.org>
13. Prospects.ac.uk (2005/02/10), <http://www.prospects.ac.uk/>
14. FSU Career Center (2004/02/22), <http://www.career.fsu.edu/>
15. Stanford University Career Development Center (2005/02/24), <http://cardinalcareers.stanford.edu/students/>
16. NC State University Career Center (2005/02/24), <http://www.ncsu.edu/career>
17. IDSA (Industrial Designers Society of America) (2005/03/07), <http://www.idsa.org>
18. Architecture.com (2005/02/25), <http://www.architecture.com/go/Architecture/Home.html>
19. Your Creative Future, <http://www.yourcreativefuture.org.uk>