Study on Customized Education through Job Analysis for the Department of Furniture Design
-Focusing on the Computer Application-Oriented Education for Furniture Design Coordinator-

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ABSTRACT

The aim of study is to suggest the improvement of the major curriculum used in the department of furniture design in two-year colleges. For this purpose two processes were conducted step by step. The first phase was to evaluate the jobs selected by job analysis specialist and staffs in charge in July 2009, and to analyze what are the desired points for the good adaptability and business improvement in case that student would find job in relevant field after graduating from colleges. Furniture design coordinator hereupon was selected as the object and DACUM (Developing A CurriculUM) was applied to the method of job analysis. In the second process conducted from September 2009 to October 2010, the customized curriculum based on the result from the first phase was newly opened to help student create any design result.

This study was composed of the result of job analysis, the customized curriculum based on it and the research of efficiency through the end result and finally the discussion how to improve the customized education for the future. It is no doubt very important process for the step up of quality of college education, the improvement of students' competence and their good adaptability after finding jobs. This study should lay the foundation of different job analysis and the customized curriculums accordingly for not only furniture design coordinator, also for various furniture design-related jobs, and furthermore it should be expected that the continuous research and development contributes to the realization of college education to raise excellent students.

Key words: Job Analysis, Customized Education, Furniture Design Coordinator.

요 약

본 연구의 목적은 2년제 대학 가구디자인 전공 교육과정의 개선을 제안하는 데 있다. 이 목적을 이루기 위하여 2단계의 단계별 과정을 수행하였다. 첫째는 직무분석 전문가와 실무 관계자들을 중심으로 하여 선정된 직종의 직무분석을 하고 학생이 졸업 후 해당 직종에 취업할 경우 취업 적응력 및 업무 향상을 위하여 필요한 내용이 무엇인지 분석을 하는 것이었다. 대상 직종은 가구디자인 코디네이터로 선정하여 진행하였다. 두 번째 단계에서는 1단계 직무분석에서 도출된 결과를 토대로 하여 맞춤형 교과과정을 새로이 개설하고 수업을 진행하여 학생들의 디자인 결과물을 유도하였다. 연구결과 학생들의 실무작업에 대한 이해도와 작품 완성도가 높아졌으며 전공 수업에 대한 신뢰도가 향상되었음을 확인할 수 있었다.

　　　본 연구에서는 직무분석 결과와 이에 따른 맞춤형 교과과정의 시행 내용, 그리고 최종 결과물을 통해 연구의 효율성 검토 그리고 향후 개선 방향의 제안 등으로 구성하였다. 이는 대학 교육의 내실을 기하고, 학생들의 경쟁력 제고 및 취업 후 업무 적응능력 향상 등의 목적을 달성하기 위하여 매우 중요한 과정이라 믿어 의심치 않는다. 본 연구를 통하여 가구디자인 코디네이터라는 직종뿐 아니라 다양한 가구디자인 관련 직종의 직무분석 및 그에 따른 맞춤형 교육과정 시행의 초석이 다져지길 바라며 더 나아가 지속적인 연구 및 개발을 통해 우수한 인재를 양성할 수 있는 대학 교육의 실현을 기대한다.

1. PURPOSE OF STUDY

　　　Nowadays, it is important for the competitive and efficient college education to analyze exactly what kind of jobs companies require student and to develop the program with the education module accordingly. This is to keep pace with the gradually departmentalized and specialized job sectors of modern society and to lead the college education dealing with different works which business field requires each time. In design sector particularly where the work changes and trend development happen quickly and the educated content is closely associated with the business field, it is getting important that the development of education program tied with the practical business.

This study intended to understand the assignment of furniture design coordinator and to analyze it and furthermore to develop the customized curriculum for raising persons who are actually required in practical business filed. Also the customized education according to the developed curriculum should be conducted in order to find its advantages as well as disadvantages, for suggesting the improvement for the future.

　　　It was necessary process for the higher-qualified design education that the customized curriculum was established and conducted according to the job analysis, and this should be a basis to turn out many excellent designers.

2. SCOPE and METHODS

　　　This study was progressed by the focus on the job analysis and the development of the customized curriculum conducted in 2009 for enhancing international competitiveness of the department 'Living and Furniture design' at Seoil Univerisity and offering jobs to students and also helping them to adapt themselves to the business field later on. First of all, the tasks list of the job selected by the preparatory survey and the job analysis accordingly was targeted here and furniture design coordinator was the object of this study. The selected tasks list was compiled as a database for the set-up of the customized curriculum followed up. According to the customized curriculum organized in the first phase, the additional special lectures were carried out besides the regular courses and the result came out and also the feed backs were presented.

　　　For job analysis the basic research proceeded first through literature, internet searching and professional advice and on this basis the expert was invited to plan the workshop in order to classify the relevant jobs involved in furniture design coordinator according to the type of occupation and to establish the tasks list. Analysis of job was based on DACUM (Developing A CurriculUM)[2]

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[2] Job analysis can be conducted by different methods like actual performance, observation, interview, questionnaire, analysis of the result, job sheet and record of important affair and each method has pros and cons. DACUM is also one of such job analysis methods, which is unique, innovative and very

developed at Ohio State University, and the workshop in which 7 SME (Subject Matter Expert) took part for investigation analyzed the concerned job by organizing its definition, mission, performance and requirement and finally drew the end result, the research chart.

The step-by-step customized education based on the research chart[3] was conducted by the invited experts who have many experiences in education as well as in practical field of the concerned job, after sufficient consultations with the professor, and also the professor took part in each lecture to supervise the education course and this contributed to the in-depth lecture because with this the actual exchange of the feedbacks was available at the site during the education.

3. OUTLINE of JOB ANALYSIS

Job analysis means the systemized process to collect all information regarding the content & characteristics of job and to organize them according to each purpose. In other words, it can be understood as the process to organize and analyze the content and requirement of job which organization demands. (Refer to table 1).

For the efficient job analysis, it should be definitely defined first of all that the relation between the job and human. For this again, the content and characteristic of each job have to be primarily clarified, e.g. what kind of job, in which way, for which purpose, where and for it's successful execution which level of knowledge, experience, function and responsibility are necessary and so on.(Kang 2000)

Table 1. Terminology and Definition related on Job Analysis

Terminology	Definition
Task	One definite job activity carried out for separate purpose
Position	One or more jobs performed by one individual of the specific organization at the specific timing
Job	Group consists of persons with similar kind of job and similar position / In case of that there is no similar position, one position makes a group.
Job family	Job group including more than two jobs which requires similar characteristic of staff or similar task

3-1 Procedure of Job Analysis

(1) Background data collection

This phase is mostly done in the preliminary investigation. Available background information like organization chart, work responsibility schedule, job description and job specification are collected in this stage.

(2) Selection of representative position to be analyzed

Although all tasks can be analyzed, the selected position is representatively analyzed in general due to the question of time and cost.

(3) Acquisition of job information

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efficient. DACUM has begun with the estimation of vocational training program and the development of education course in USA, 1966. (Kim 2005)

[3] The necessity of course in various major subjects was emphasized for the education of furniture design coordinator, but the curriculum was customized focusing on the computer application-oriented education, for the computer utilization skill among others was importantly treated and it's efficiency as well.

This phase is usually said as job analysis. Here the job is analyzed in detail, in consideration of the characteristic of job, staff's attitude required and good personality. The different methods to be used are aforementioned.

(4) Drawing up of job description

On the basis of the information obtained in the former phase, job description is drawn up now. It means a document describing not only the important characteristics of job but also the required activities for the efficient execution.

3-2   DACUM Job Analysis

The method for job analysis aforementioned are various but their detailed contents had been already organized in many literatures case by case, so the describing with regard of this was omitted in this study. Instead, this study focused on DACUM regarded as the most efficient way to develop the education course and to establish the customized curriculum. DACUM is a method for job analysis which has been utilized to develop the education course and it was first developed in Canada 1970 and then it have advanced by Dr. Norton at Ohio State University. The DACUM chart (task list) resulted from DACUM job analysis is used for the development of education course, the training program of staff and the yardstick for judgment of business filed. The workshop in which DACUM facilitators and five or twelve SME took part case by case comes up with a final result by analyzing the expertise of the concerned job, the requirement of the industry and the level of skill. After drawing the final result, it is completed through the feedback process for the verification of reliability.

4. JOB ANALYSIS : FURNITURE DESIGN COORDINATOR

On July 4th 2009 one DACUM facilitator, one DACUM coordinator and 7 SMEs and one clerk drew the result of job analysis regarding furniture design coordinator through the analysis of written information, interview and workshop. 7 SMEs consist of the invited experts who meet certain qualifications[4], and this was necessary for the objective and professional job analysis and the development of education course. In result, the following characteristics and classification of job were reached.

4-1   Job characteristics of furniture design coordinator

(1)   It is required that the active attitude to accept and solve the requirements in job field by understanding and acquiring the technologies which are constantly changed and develop, and also creativity and expertise are necessary.

(2) For the reason there are many team-works and it is closely associated with graphic-, engineering-, marketing department and furthermore with clients, having interest in them, the communication skill, cooperation and the sociability are here desired as important virtues.

(3) The ability to observe and express the object exactly and the good recognition regarding space and also the ability of plastic are highly needed for drawing the visual result.

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[4]   Design Experts, staffs in practice, worker having 3-5 years job experience, who has no relation with the university requested analysis, who is neither lecturer nor faculty were the qualification and this was to understand more substantial and exact requirements from company side for efficient job analysis. Also SME who was not involved in university itself and university education was invited to guarantee the objectivity of the workshop and to exclude any consideration related with university's interest. DACUM facilitator (professor) had no right to speak and to lead the workshop.

(4) In case of furniture design, the sense of beauty and subjective decision of designers are demanded, so it is very difficultly said what would be the exact method or rule for reaching the best design, but there are many various cases. Therefore it is important factors that the creative and logical thought of designers and their ability not only to figure out the problem, also to choice the second best plan for solving problem, and also their adaptability. In addition, the ability to make keen judgment as to the applied method and to understand the necessity should be developed.

(5) Furniture design coordinator has to possess the excellent & professional sketch skill, rendering, modeling and computer assignment for a good expression about design result and a smoothing communication with other department. Computer assignment in particular should be handled skillfully from 2D to 3D and all kinds of soft wares have to be treated by them for mutual cooperation.

4-2 DACUM Research Chart of furniture design coordinator

The following figure 1 shows the DACUM research chart according to business sectors which was born by job analysis (Lee 2009).

Fig. 1 DACUM Research Chart of furniture design coordinator according to business sectors

4-3 Job knowledge, attitude, equipment, future trend and concern

Table 1. Chart of job knowledge, attitude, equipment, future trend and concern of furniture design coordinator

(General Knowledge and Skills)	(Worker Behavior)
Foreign language skill, business manner, etiquette at office, psychology, relationship, reasonable thought, quick judgment, understanding, common sense, driving license, good presentation, literary knowledge, human engineering, management, statistic, picture.	Flexibility, patience, diligence, creativity, sincerity, morality, activity, application, cooperation, responsibility, positive thinking, quiet & exact & rapid attitude, kindness, detail, organizational power, service mind, challenge, leadership, reasonable thought, business-minded, good reflexes.
(Tools, Equipment, Supplies and Materials)	(Future Trends and Concerns)
- Computer and peripheral devices such as scanner, printer, laptop and tablet etc. - Wood-working machine, NC tools, RP(Rapid Prototype) tools, wood-working tools. - Drawing tools (marker, colored pencil, sketchbook, tracing paper). - Tapeline, scale ruler, calculator, camera - PC Software (AutoCAD, PhotoShop, Illustrator, Corel-Draw, Rhino, 3DS max, Excel etc.). - Various material (wood, steel, fabric, plastic etc.).	- Role as a coordinator to connect furniture design with architecture- , interior- and article-related design and to lead new life and culture being characteristic. - Good prospect as the specialized job to meet different customers need, in company with the departmentalizing trend of jobs (Role of coordinator at present is being highly demanded.). - Importance of furniture design coordinator will be increased along with the tendency that customer's preference influences trend sensitively. - Innovation from the existing mass production to the customized creation of value will demand the expert in the industries based on knowledge service for the 21st century. - Designer is highly needed who is able to handle and manage the design-processing based on the digital technology.

5. PROCESS of the CUSTOMIZED EDUCATION ACCORDING to JOB ANALYSIS

According to job analysis, the necessity of the additional education was raised in many education courses and among others computer utilization skill was of great importance. It was no wonder that companies required the 2-years college graduates to be able to utilize primarily computer, and this was reconfirmed through job analysis this time, because the most staffs in charge asked strongly whether the multiple utilization of the all design-related softwares are available, not the simple use of one specific program.

Under the circumstances that designer who supports all kinds of computer systems from 2D softwares such as Photoshop, Illustrator, AutoCAD to 3D soft ware is demanded, unlikely the past when visual-, product- and craft design were clearly separated, the counter plan for that should be seriously sought and the practical business-oriented education had to be opened urgently.

Due to this need, the step-by-step customized curriculum was opened and carried out from September 2009 to October 2010 for cultivating furniture design coordinator. The courses were additionally conducted besides the regular curriculum, in the forms of special lecture during vacation and also lecture by the invited expert, and the graduate-to-be in 2011 were the object for increasing the efficiency. The step-by-step curriculum is as follows.

5-1　Adjustment of computer curriculum opened as basic major course

AutoCAD, Photoshop, Illustrator, 3DS Max, Rhino which belong to major curriculum were conducted by focusing on acquisition of basic command and tool, and the more creative course in an atmosphere of freedom was pursued. Not only the furniture design-related subject, but also independent issues being entirely unrelated to the major were allowed during the course. By doing

so, the course induced student to acquire extensive knowledge specialized. This is said as the first phase for the customized education.

5-2   Special lecture regarding AutoCAD and obtaining a certificate

Those who completed the computer-related basic major course took part in special lecture regarding AutoCAD and in certificate preparation class as well for obtaining the education related to the practical business, too. The special lecture dealing with AutoCAD was carried out under the leadership of the professional who has working experience more than 5 years while the most frequently happened mistakes were focused, such as wrong dimension, missing dimension and overlapped line etc. In parallel, the customized class for preparation of CAD certificate was done and it resulted in application for the qualifying examination of AutoCAD 2D organized by Korea Graphic Design Association on April 26th 2010. Among the 66 students who completed the course, 46 passed the examination (the ratio of successful applicants : 69.7 %) and it is remarkable point considering that this ratio for all applicants is 20-30 % more or less.
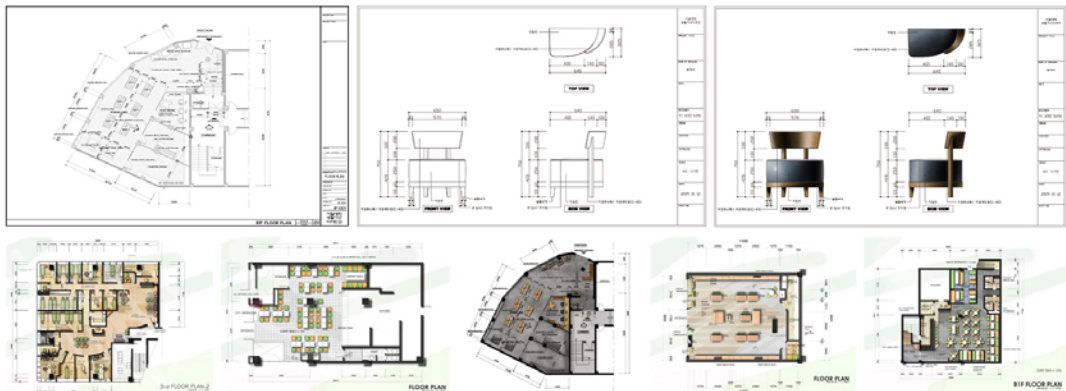

Fig. 2 Examples of AutoCAD 2D drafts and 2D coloring images using Photoshop and Illustrator.

5-3   3DS Max and special lecture for Graphic

For 30 candidates among the students applied for the CAD special lecture, 3DS Max and special lecture for graphic were executed 75 hours during summer vacation. Max special lecture was carried out considering the intermediate- and advanced level, because it was for the student who had already completed 3DS Max regular curriculum for one semester. The invited lecturer was an expert who had more than 10 years professional experience in the related field and educational experiences as well, and also had ever written on teaching material regarding 3DS Max. The reason why the invited expert was brought into the lecture was mainly that the expertise should be guaranteed first and student will be able to find job in the related field and to understand & adapt to the job description sooner and better. The main purpose of lecture was to develop the ability to react to the practical business on the ground of rather technical content than theoretical. The result of lecture was focused on furniture design modeling and interior design modeling on the basis of the produced AutoCAD draft, for considering the major characteristic as furniture design coordinator. Furthermore there was another process to edit the completed 3D result by using 2D graphic software and this was for student also to develop the ability to correspond to different working environment.

Fig. 3 Results of 3DS Max modeling course (furniture design, interior design).

5-4 Integrated training for adaptation to the practical business

The student who were trained to deal with the computer-related practical job through the customized curriculum for the developing furniture design coordinator progressed to the course 'plan for furniture and interior', the major subject of the second semester for trying the entire design process from the beginning to completion step of design. They carried out the course in the order of making a virtual client first, researching data, creating design concept, developing ideas and spreading out furniture & interior design, and then drawing AutoCAD draft, design modeling and presentation panel. During the final panel work, 30 hours computer modeling course and practical technique course for graphic were additionally supported and it was for student to improve the understanding and to maximize the efficiency of work. In the special course for graphic the invited lecturer educated and analyzed with his own work made in practical field in steps for the realistic lecture, and the presentation expressed by the invited expert made the exchange of the feedbacks between student and lecturer and hereupon the education regarding good presentation skill and attitude were additionally carried out.

Fig.4 Presentation panel prepared by AutoCAD, Photoshop, Illustrator and 3DS Max.

Table 2. Trouble exposed in each step and Troubleshooting

Subject	Trouble pointed out by lecturer	Suggestion for troubleshooting
AutoCAD	- Basic command was understood well, but at writing dimension and plotting problem showed. - Lack of experience to connect with other programs and of know-how to shorten working time by using AutoCAD blocks (Database). - OSNAP function was not applicable, and little understanding regarding the error happened at the 3D software-related work resulted from the mistake such as overlapped lines.	- See the actually made mistake directly and revise it and develop the ability to solve the problem s. - Training with the real sample which is actually used in practical filed for good adaptability to the practice. - Suggestion of training method for upskilling of each student for future.
Photoshop & Illustrator	- Understanding as to Layer and Basic Command is good. - Lack of coloring skill for interior and furniture. - Lack of information to revise 3D Rendering end result and insufficient ability to solve the problem. - Lack of image size & resolution for plotting and editing. - Poor judgment to select one between Photoshop and Illustrator or to use both of them, in case of specific work. - No experience and know-how regarding NC processed data.	- Coloring training for interior and furniture through the real example used in practical field. - Offering course re. furniture Photoshop and furniture Illustrator. - Try to approach to the concept of image size by printing in practice. - Education of the different software-related work and know-how and education of preparation for the NC processed data.
3DS Max	- Realization level of command and work is low generally. - Lack of skill re. work know0how after importing AutoCAD data. - No ability to respond to the errors happened at AutoCAD date processing. - Insufficient skill to save and revise the rendering result. - Lack of ability to utilize block files / poor possession of personal data / insufficiency of idea regarding data collection.	- Cultivation of ability to solve problem by relating individual tasks with other program. - Special lecturer for revision of 3D result made by Photoshop and retouch. - Education of block file construction used often in practice and establishment pf personal data base.
Rhino	- Understanding of command and realization of working are good. - Insufficient technique for modeling with the high level of difficulty. - Rendering based on the own plug-in program is excellent, but utilization after relating with other program is deficient. - Poor experience to prepare RP data. - Lack of ability to connect with other programs.	- Concentrate training regarding the connection between Rhino modeling work and 3DS Max - Suggestion of RP processed example based on Rhino work.

6. CONCLUSION

For competitive university education and development of desirable human resource it is necessary among others to understand the scope and requirement in practical filed exactly and to cover them. In design sector particularly which is sensitive of changes and urgently requests international competitiveness it should be preceded that the education through defining and analyzing the jobs corresponding with the current status of the practical business field.

This study contributed to understanding of the objective content regarding the definition and job description of furniture design coordinator. It could offer the designer-to-be who is seeking a job in the concerned or related filed the opportunity to confirm and respond to the requirements companies need, and the education institutions can utilize it as basic material for development of the customized curriculum, teaching material and fair estimation system and so on.

Also the intended purpose to strengthen the competitiveness of students and to improve their adaptability in the practice was achieved by the data drawn by job analysis and the execution of the customized curriculum based on it.

In order to carry out the customized curriculum efficiently it was necessary that the clear definition regarding the concerned job with the help of the correct job analysis and the reorganization of the curriculum accordingly. For the two-year college in particular it should be recognized that the education has to be closely associated with the requirements in the practical business and the improvement for this direction should be recommended. The customized curriculum handled in this study was about the computer-related utilization and students were satisfied with the result that they could learn and exercise the high-level computer application skill, and also the grade of the end production was advanced.

The invited experts who were specialized on the design program and were active as designer in deed, but had difficulties to be appointed as professor due to the question of time and their academic background played a meaningful role for the satisfaction of students, and it should be regarded as the raised point that they contributed to the effectiveness of the two-years university in consideration of reaching the troubleshooting occurred in the actual working process. Despite of many changes currently the recruitment of the part-time or full-time lecturer at college in Korea is not managed so flexibly like foreign cases, but it still matters in our society which university people graduated from and the ties they have with other alumni and the cooperation system between industry and university is not enough. Such problems should be supplemented very soon to follow the constant research & development of the more efficient and useful education curriculum for students.

In conclusion, there should be the different job analysis and the customized curriculum dealing with various kinds of job supported by continuous interests and attempts which will definitely contribute to improving design education and fostering design students.

7. REFERENCES

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