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## **Employment of College Graduates in the Era of Universalized Higher Education**

A Comparative Study by School Type  
and Discipline

*Abstract: The employment performance (including salaries, relevant to studies and job satisfaction) of college graduates from different school types and disciplines after the universalization of higher education in Taiwan was examined and a comparative analysis was conducted in this article. The findings were as follows: 1) “Medicine and health” and “industrial arts” were the best disciplines in terms of overall employment performance; however, “arts,” “agriculture,” “mass media,” “physical education/other,” “home economics,” and “tourism services” performed poorly overall in terms of employment. 2) The graduates’ employment*

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English translation © 2013 M.E. Sharpe, Inc., from the Chinese text, “Gaojiao puji hou dazhuan biyesheng jiuye biaoqian zhi bijiao: Jiaoyu leixing ji xuemen guandian.” Translated by Michelle LeSourd.

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*performance in the school type of “public universities” was better than others for the most part in Taiwan; however, the graduates of “public universities” who majored in arts, agriculture, mass media, physical education/other, home economics, and tourism services did not do well in terms of their employment performance. Based on the analysis, from the viewpoint of employment, we suggested that Taiwan’s colleges and universities restructure the disciplines within their institutions and we also offered some suggestions to high school graduates about how to choose higher education institutions and disciplines.*

The employment of college graduates has been a long-standing subject of great interest in countries around the world. Between 2004 and 2007, Taiwan’s higher education gross enrollment rate increased from 78.56 percent to 85.31 percent (Ministry of Education, Republic of China 2008), and its higher education system appears to have entered the universal stage (Trow 2005). The people of Taiwan, however, have some concerns about the universalization of higher education, including a decline in the quality of education and of the students themselves; the devaluation of degrees, leading to employment difficulties or low wages for graduates; and a disconnection from the job market, resulting in graduates not being able to find employment suited to their education or being unemployed (Chuang 2006).

In this article, we aim to examine the employment performance of college graduates from different school types and disciplines after the universalization of higher education in Taiwan and make a comparative analysis. Based on that analysis, we suggest, from the point of view of employment, that Taiwan’s colleges and universities might restructure the disciplines within institutions and offer suggestions about how to choose between types of higher education institutions and disciplines.

## **Research Design**

This research focused on the employment performance of college graduates from different types of institutions, by category, after

the universalization of higher education in Taiwan and included a comparative analysis. The analysis included the categorical independent variables “school type” and “discipline,” and employment performance was measured by the categorical dependent variables “salary,” “relevance to studies,” and “job satisfaction.”

### **Research Sample**

The research sample for this article was taken from a survey of college graduates one year after graduating in the 2005 academic year that was released in 2008 by the Taiwan Integrated Postsecondary Education Database. The online questionnaire survey was implemented between June 2007 and February 2008 and, using a census method, surveyed 262,743 graduating students from 158 colleges and universities in Taiwan. A total of 88,694 responses were received, a recovery rate of 33.76 percent (Center for Educational Research and Evaluation, National Taiwan Normal University 2008). Since this research focused on analyzing the employment of graduates, it was necessary to delete master’s students continuing their education, those going into military service, and those currently unemployed. In addition, since the decision-tree algorithm is extremely sensitive to missing values, to avoid errors it was necessary to delete respondents who did not completely fill in their questionnaires. The result was an effective sample size of 37,289.

### **Data Analysis**

For this research, we used SPSS 13.0 to perform a CHAID decision-tree analysis (see Koehler 2000 and StatSoft, Inc. 2008) examining the employment performance (including salary, relevance to studies, and job satisfaction) of graduates according to their classification by discipline and school type (SPSS, Inc. 2004), and we also used these results as the basis for a comparative analysis. In terms of validity, we used approximately 70 percent of the effective sample size of 37,289 as a training sample to create the decision-tree model.

The remaining 30 percent of the effective sample was used as a test sample in order to test the model for external validity (inference validity) and the presence of the overlearning effect (Yin 2007).

### **The Universalization of Higher Education and Graduates' Employment Performance**

When higher education enrollments rate surpass 50 percent, a system can be classified as "universal" (Trow 2005), and 2004 statistics from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) showed gross higher education enrollment rates above 50 percent in the United Kingdom (60 percent), France (56 percent), Italy (63 percent), Spain (66 percent), the Netherlands (57 percent), the United States (82 percent), Canada (62 percent), Japan (54 percent), and Taiwan (79 percent) (Ministry of Education 2008). This indicates that by 2004, higher education had entered the universal stage in all of these major countries.

The topic of university graduate employment has been a focus of attention around the world over the years (University of Kassel 2007). Brennan and Tang (2008a) pointed out that the incomes of European graduates from different disciplines in their first job were, from highest to lowest in terms of discipline, vocational sciences, nonspecialized sciences, specialized humanities, and nonspecialized humanities. In terms of correlation between field of study and first job, nonspecialized humanities graduates had the highest rate of working in different fields or nonspecific fields (a relatively low relevance to studies), whereas vocational sciences graduates had the highest rate of working in fields fully corresponding to their fields of study. In a subsequent study, Brennan and Tang (2008b) found that except for a relatively low Italian job satisfaction rate (58 percent), graduates from the other ten countries, including the United Kingdom, had a job satisfaction rate between 63 percent and 74 percent. Overall, it is clear that in European countries, graduates feel satisfied with their work, while there are some differences in the incomes and relevance to studies among graduates from the various fields of study.

In Taiwan, a study of the employment choices of health care administration graduates from different types of institutions (Liu 2006) discovered that relatively few of them felt that their work must be entirely connected to their studies. In terms of school type, the response was general universities (7.2 percent), technological universities/technical colleges (4.8 percent), and medical universities (1.7 percent). The vast majority of students thought that their work must only be slightly connected to their studies; this response was technology universities/technical colleges (67.7 percent), medical universities (60.9 percent), and general universities (57.8 percent). In terms of the salary of their first job, graduates of general universities (87.1 percent), technological universities/technical colleges (88.7 percent), and medical universities (90.0 percent) generally expected a monthly salary of 20,000 to 40,000 New Taiwan (NT\$) dollars. Only minor differences in salary expectations existed between graduates in health care administration from different types of schools, but whether there are differences among other disciplines remains to be studied.

Since the universalization of higher education, the question of the employment of their graduates has gradually become an important consideration when universities add or cut departments and schools and when high school graduates choose an institution and a field of study. At present, the literature examining graduates' employment performance (including salary, relevance to studies, and job satisfaction) based on different school types and disciplines is very limited. In this article, we therefore use an in-depth research approach in the hope of promoting the development of higher education.

### **Comparison of Graduates' Salaries by School Type and Discipline**

For the purposes of this article, "school type" refers to an institution's classification as public or private and as general academic or vocational/technical. Institutions are divided into four categories: public universities, public vocational/technical schools, private universities, and private vocational/technical schools. "Discipline"

refers to the classification of academic fields, which are divided into the eighteen categories of education, arts, humanities, economics/sociology/psychology, business and management, law, natural sciences, mathematics/computers, medicine and health, industrial arts, engineering, construction/urban planning, agriculture/forestry/fishing/animal husbandry (referred to below as agriculture), home economics, transportation and communications, tourism services, mass media, and physical education/other. "Salary" refers to average total monthly income from work; the currency unit is NT dollars (NT\$). Salary is divided into under NT\$30,000, between NT\$30,000 and NT\$45,000, and over NT\$45,000.

The categorical independent variables "school type" and "discipline" and the categorical dependent variable "salary" were used to obtain graduate salary performance based on school type and discipline. These were used to create a decision-tree model (not shown due to space limitations). In assessing the model, the training sample had an overall accuracy rate of 65.3 percent, and the test sample had an overall accurate rate of 64.0 percent. This accuracy rate of over 60 percent, with the two values close to each other, demonstrates that the model does not have an overlearning effect, has good external validity, and also has inference validity and cross-sample validity. In addition, the following findings were made (C refers to classification accuracy):

1. Graduates with monthly salaries over NT\$45,000:
  - A. Medicine and health and industrial arts graduates from both public and private universities (C = 43.3 percent) had the highest monthly salaries among all graduates from the different school types and disciplines.
2. Graduates with monthly salaries between NT\$30,000 and NT\$45,000:
  - A. Medicine and health and industrial arts majors, regardless of whether they graduated from public or private vocational/technical schools, once employed had a monthly salary of between NT\$30,000 and NT\$45,000, the second-highest set of salaries. In contrast, medicine and health and industrial arts graduates from public

and private universities were generally able to receive a monthly salary of over NT\$45,000. These data indicate that in recent years, medicine and health and industrial arts have indeed been the hottest disciplines overall in terms of higher salaries.

- B. On the whole, graduates in any discipline from public universities have the best opportunity to earn a salary of between NT\$30,000 and NT\$45,000. At present, among graduates in education, humanities, construction/urban planning, economics/sociology/psychology, business and management, law, engineering, natural sciences, mathematics/computers, and transportation and communications, public university graduates generally have more access to this second-highest salary level.
  - C. Outside the disciplines of medicine and health and industrial arts, public vocational/technical school graduates majoring in economics/sociology/psychology, law, and engineering have more opportunities to earn monthly salaries between NT\$30,000 and NT\$45,000.
3. Graduates with monthly salaries under NT\$30,000:
- A. Employed graduates who majored in arts, agriculture, mass media, physical education/other, home economics, and tourism services, whether from public/private universities or public/private vocational/technical schools, all fell into the lower monthly salary category of under NT\$30,000. In other words, among public university graduates, only those in arts, agriculture, mass media, physical education/other, home economics, and tourism services had monthly salaries under NT\$30,000.
  - B. Outside the above disciplines, private university graduates in education, humanities, construction/urban planning, economics/sociology/psychology, business and management, natural sciences, mathematics/computers, and transportation and communications were in the lower salary bracket of under NT\$30,000 per month. Graduates of both public and private vocational/technical schools in humanities, construction/urban planning, business and

management, natural sciences, mathematics/computers, and transportation and communications as well as private vocational/technical school graduates in economics/sociology/psychology, law, and engineering also had monthly salaries under NT\$30,000.

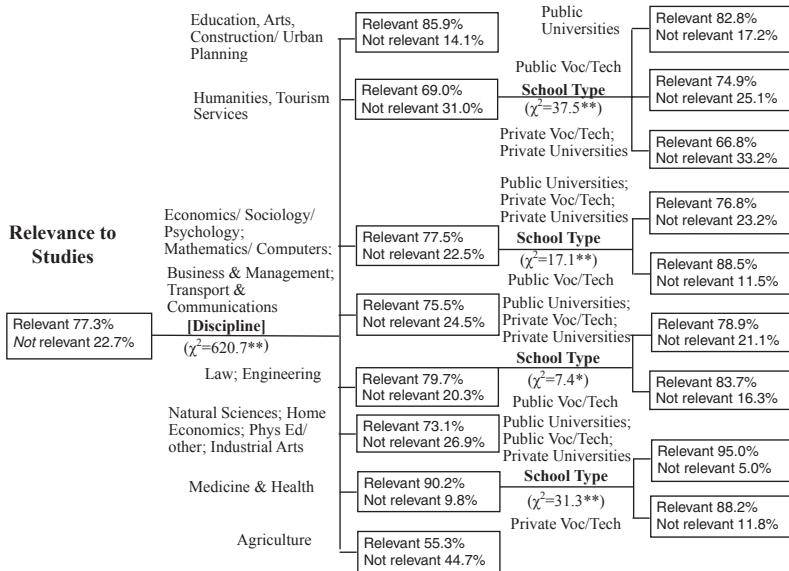
4. Looking at the above, we can clearly see that on the whole since the universalization of higher education in Taiwan, graduates in medicine and health and industrial arts can generally earn higher salaries regardless of school type and that graduates in most disciplines from public universities tend to be more highly paid when employed. It is evident that although the establishment of more medium-sized and large universities increased the number of students enrolled, nevertheless public university graduates are relatively more competitive, or there is possibly a trend toward the more outstanding students competing to study at the public universities. The disciplines at public universities resulting in relatively low salaries for graduates include arts, agriculture, mass media, physical education/other, home economics, and tourism services.

### **Comparison of Relevance of Graduates' Jobs to Their Studies by School Type and Discipline**

“Relevance to studies” for the purposes of this article refers to whether graduates’ current jobs are related to the disciplines they studied in college. The categorical independent variables “school type” and “discipline” and the categorical dependent variable “relevance to studies” were used to obtain the relationship of graduates’ jobs to their studies by school type and discipline. These were used to create the decision-tree model seen in Figure 1. In assessing the model, the training sample had an overall accuracy rate of 77.3 percent, and the test sample had an overall accuracy rate of 77.2 percent. This accuracy rate of over 60 percent, with the two values close to each other, demonstrates that the model does not have an overlearning effect, has good external validity, and also has inference validity and cross-sample validity. The following conclusions can be made from Figure 1:



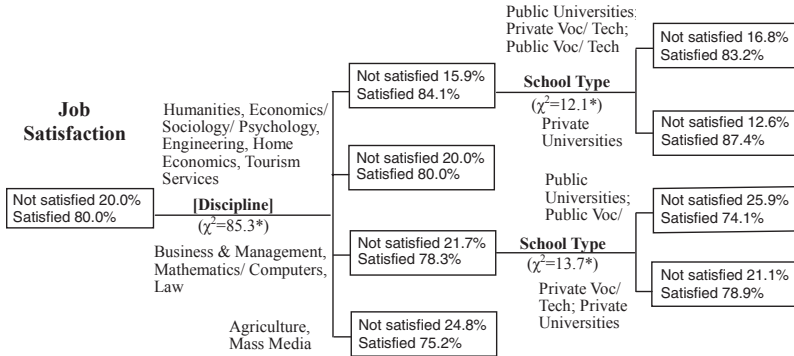
Figure 1. **Decision-Tree Model Comparing Relevance of Graduates' Jobs to Their Studies by School Type and Discipline**



Notes: \*  $p < .05$ ; \*\*  $p < .001$ .

1. On the whole, the employment of graduates from all school types and disciplines tends to be “relevant” to their studies ( $C = 55.3\text{--}95.0$  percent). We can see that after the universalization of higher education, most graduates can apply their knowledge and for the most part do not engage in work unrelated to their education.
2. The graduates with employment most relevant to their studies are those majoring in medicine and health at both public and private universities as well as public and private vocational/technical schools ( $C = 88.2\text{--}95.0$  percent). Those with comparatively low relevance majored in agriculture at both public and private universities as well as public and private vocational/technical schools ( $C = 55.3$  percent) and humanities and tourism services majors from private universities and private vocational/technical schools ( $C = 66.8$  percent).

Figure 2. Decision-Tree Model Comparing Graduates' Job Satisfaction by School Type and Discipline



Note: \*  $p < .01$ .

### Comparison of Graduates' Job Satisfaction by School Type and Discipline

“Job satisfaction” in this article refers to graduates’ satisfaction with their current jobs. The categorical independent variables “school type” and “discipline” and the categorical dependent variable “job satisfaction” were used to obtain graduates’ job satisfaction by school type and discipline. These were used to create the decision-tree model seen in Figure 2. In assessing the model, the training sample had an overall accuracy rate of 80.0 percent, and the test sample had an overall accurate rate of 80.2 percent. This accuracy rate of over 60 percent, with the two values close to each other, demonstrates that the model does not have an overlearning effect, has good external validity, and also has inference validity and cross-sample validity. The following conclusions can be made from Figure 2:

1. On the whole, graduates from the various school types and disciplines were inclined to give a “satisfied” rating of their job satisfaction ( $C = 74.1\text{--}87.4$  percent). It is evident that after the universalization of higher education, over 70 percent of

- graduates remained satisfied with the jobs that they found.
2. Those with the highest job satisfaction were graduates from both public and private universities as well as vocational/technical schools in the disciplines of education, arts, natural sciences, medicine and health, construction/urban planning, transportation and communications, physical education/other, and industrial arts ( $C = 83.2\text{--}87.4$  percent). Those with lower job satisfaction included graduates from public universities and public vocational/technical schools who majored in business and management, mathematics/computers, and law ( $C = 74.1$  percent) and graduates of both public and private universities as well as vocational/technical schools in agriculture and mass media ( $C = 75.2$  percent).

## Conclusions and Recommendations

### *Conclusions*

This comprehensive comparative analysis suggests that since the universalization of higher education in Taiwan, the overall employment performance in terms of salaries, relevance to studies, and job satisfaction of graduates in medicine and health and industrial arts, whether from public or private universities or vocational/technical schools, is generally superior to those from other disciplines. The relevance to studies for industrial arts, however, was relatively low (73.1 percent).

We also found that for the majority of disciplines since the universalization of higher education, graduates from public universities generally tended to have relatively higher salaries, relevance to studies, and job satisfaction, indicating that graduates from public universities were more competitive in terms of employment. Those receiving lower salaries among public university graduates included those majoring in arts, agriculture, mass media, physical education/other, home economics, and tourism services. Although these disciplines also resulted in lower salaries for graduates of private universities as well as both public and private vocational/technical schools, when compared to graduates whose relevance

to studies and job satisfaction were generally higher regardless of school type or discipline, the employment performance of these disciplines was particularly unfavorable. For institutions, it would be worth considering a restructuring of their departments or schools in these disciplines or reducing the number of students admitted. We also suggest that vocational and high school graduates consider choosing other disciplines with better employment performance unless they clearly have a high inclination toward the discipline in question.

In addition, among the disciplines with lower employment performance, agriculture in particular performed significantly lower than other disciplines in terms of salary (below NT\$30,000), relevance to studies (55.3 percent), and job satisfaction (75.2 percent). Mass media also performed significantly lower in terms of salary (below NT\$30,000) and job satisfaction (75.2 percent). This discipline only performed relatively better than other disciplines in terms of relevance to studies (76.8–88.5 percent).

### ***Recommendations***

Based on the findings of this research, we make the following recommendations from the viewpoint of employment performance:

- A. Medicine and health and industrial arts are the best disciplines in terms of overall employment performance for both public and private universities as well as vocational/technical schools. They can be prioritized by institutions in terms of increasing the number of academic departments and schools as well as student enrollment; students might prioritize choosing to major in these disciplines.
- B. Arts, agriculture, mass media, physical education/other, home economics, and tourism services perform relatively poorly overall in terms of employment. We suggest that institutions consider restructuring their departments or schools in these disciplines or reducing their enrollments. We also recommend that students consider not choosing these disciplines unless they clearly have an inclination toward these professions.

- C. We recommend that high school graduates prioritize choosing public universities, but if they wish to study arts, agriculture, mass media, physical education/other, home economics, or tourism services, the type of school does not have to be a consideration.

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