Educational Resources, Job Match, and Employment Outcomes in Taiwan

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Abstract

Adolescents' over-education and person-job match have become the serious issues in understanding the school-to-work transition. With the expansion of post-secondary education in Taiwan, adolescents tend to have longer years of education than previous generations. In this study, we argue that the concept of educational resources can provide an important perspective in understanding adolescents' labor market experiences after graduation. In order to examine the research questions, we use data from Taiwan Education Panel Survey and Beyond (TEPS-B), and we specify four types of educational resources in post-secondary education: social communicative, cultural, quantitative, and computer resources. Three main findings of this study are: (1) Educational resources have positive effects on job match for college graduates; (2) The positive effect of social communicative resources is more robust than other educational resources in determining job outcomes; (3) Job match has positive effects on income and job satisfaction.

Key words: school-to-work transition; educational resources; job match; job satisfaction

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I. Introduction

With the expansion of higher education in most countries, the school-to-work transition has become one of the most important issues in the social science research. For example, 1/5 of young workers are over-educated in OECD countries in 2005 (Quintini & Sebastein 2006). Years of schooling, as the index of general human capital, used to be one of the powerful factors in predicting the income inequality in the labor market. But, with the over-supply of college graduates, holding a college degree is no longer a useful signal for employers to detect the level of potential productivity of job seekers. Some scholars (Gerber &Cheung 2008) pay more attention on the horizontal dimension of educational attainment and argue that institutional characteristics (college quality and type) and college experiences (field of specialization, academic performance, and pathway) are important in determining socioeconomic inequality. The other scholars (Kalmijn & Lippe 1997; van de Werfhorst & Kraaykamp 2001; van de Werfhorst 2002; van de Werfhorst 2010) try to refine the concept of human capital and argue that students can obtain different aspects of specialized trainings or educational resources in post-secondary education. Although educational resources are field-related, there are certain core competences such as analytical and critical thinking skills that can be learned across different fields of study.

In the past 20 years, we witnessed the rapid expansion of higher education in Taiwan. There were two ways to promote higher education. The first strategy is to establish new institutions. The second strategy is to upgrade existing institutions. Higher educational expansion in Taiwan tends to use the second strategy more often than the first one. As shown in Figure 1, the number of junior colleges declined after mid-1990s. At the same time, the number of four-year colleges or universities dramatically increased after early 1990s. For example, there are 78 institutions in year 1997. However, the number increased to 139 in

2002. It implies that, during that period, there was one new four-year college or university being set up every month.

[Figure 1 about here]

Higher educational expansion created a huge growth in postsecondary matriculation. As shown in Figure 2, before 1990s, about 50% of high school graduate continue their education in postsecondary institutions. However, in 2014, 90% of high school graduates entering higher education. As for vocational high school students, before 1985, most of them entered labor market immediately after graduation. However, in 2014, about 80% of vocational high school graduates continue their postsecondary education.

[Figure 2 about here]

In such a "college for all" era, what is the relationship between postsecondary educational experiences and labor market performances? On the one hand, the expansion of postsecondary education increases the level of adolescents' educational attainment. Young people tend to stay at school longer than previous cohorts, and delay the labor market entry. However, on the other hand, when the rapid increase in the number of college-educated persons exceeds the growth in highly skilled jobs, many college graduates might work for a job which could be done by persons without a college diploma.

In this study, we specify four types of educational resources: (1) social communicative resources, (2) cultural resources, (3) quantitative resources, and (4) computer resources. By using data from Taiwan Education Panel Survey and Beyond (TEPS-B), we address four main questions: (1) what kind of educational resources can students obtain in the post-secondary education? (2)Whether educational resources have positive effects on finding

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a job to apply young people's knowledge and skills? (3)Does job match play a role in determining income and job satisfaction? (4) Does gender gap in educational resources affect young people's job outcomes?

In the following sections, we first briefly review the literature related to research hypotheses and then introduce the variables used in analysis. Next, we report the empirical results from logistic regression and Ordinary Least Squares (OLS) regression analyses on job match, income, and job satisfaction. Conclusions regarding educational resources and job outcomes are then presented, and the possible implications of the research findings are discussed.

II. Research Hypotheses

II-1. Educational resources

In understanding the learning experience in school, Bourdieu (1984) argues that students can accumulate two kinds of capital: cultural capital and economic capital. When people obtain one type of capital, they tend to reduce the accumulation of the other type. In addition, according to the perspective of human capital, Becker (1964/1993) argues that there are two types of human capital: general human capital and firm-specific human capital. One of the most important characteristics of general human capital is its portability. For example, people tend to learn the basic reading and basic math skills at school. Such knowledge and skills can be used in nearly all workplaces. However, for firm-specific human capital, it is less portable. When people get a job, they start to accumulate the special knowledge and skills belong to that company. Once they quit their jobs and switch to other companies, these knowledge or skills will not be useful.

Some scholars (Kalmijn & Lippe 1997; van de Werfhorst & Kraaykamp 2001) try to elaborate the concept of human capital and argue that the learning experiences at school are more complicated than just accumulating the general human capital. In fact, students learn

different aspects of knowledge and skills at school. For example, Kalmijn & Lippe (1997) analyze 10 types and levels of schooling in the postsecondary education and argue that there are at least four types of specialized training exist: technical training, economic-administrative training, socio-cultural training, and training for the caring professions. They also point out that women tend to access more cultural and social training than men, while men obtain more science and technical training opportunities.

Furthermore , van de Werfhorst & Kraaykamp (2001) use a national representative Dutch survey data to argue that fields of study supply four types of resources to students: cultural, economic, communicative, and technical. They use the concept of educational resources to predict several outcomes such as labor market performances, consumption behaviors, and sociopolitical orientations. For example, individuals who were trained in fields that provide economic resources are more likely to attain high economic-status jobs. However, technically educated people tend to have low occupational-status jobs. From the perspective of "ideological refinement model" ,van de Werfhorst (2010) argue that education socializes particular values. People with more communicative resources are more likely to develop skills to look at issues from different perspectives.

II -2 Educational resources and job match

When most of the adolescents have opportunities to enter post-secondary education, years of schooling become less powerful in explaining the inequality in the labor market. Many scholars start to pay more attention on the horizontal dimension of education experiences (Gerber &Cheung 2008). Some types of educational resources (such as technical knowledge and skills) are more practical, but others (such as cultural resources) might have less connection to the labor market. For example, Liu & Grusky (2013) argue that there are at least four types of skills (cognitive, creative, technical, and social skill) people tend to perform in their jobs. The demand and supply for the skill types are not the same. They find

that in the past 30 years, for those jobs require analytical skills and critical thinking tend to receive the highest wage growth.

At macro level, Wolbers (2003) argues that vocational-oriented school systems can increase the job match for young people. For example, in Germany, students tend to receive both academic and vocational training in secondary education. These technical training can help students to make a smooth transition from school to workplace.

In this study, we argue that there are at least four types of educational resources in college: (1) social communicative resources, (2) cultural resources, (3) quantitative resources, and (4) computer resources. We would expect that:

> H1a: Social communicative resources have positive effects on job match for
>
>   college graduates.
>
> H1b: Cultural resources have positive effects on job match.
>
> H1c: Quantitative resources have positive effects on job match.
>
> H1d: Computer resources have positive effects on job match.

III-3. Job match and labor market outcomes

As for the relationship between job match and job performances, Wolbers (2003) argue that being able to apply knowledge and skills has a positive effect on income. When employees are familiar with the production processes, they have more control over the work. It suggests that such employees have more bargaining power in negotiating salary with employers (Sorensen & Kalleberg 1981). Since the employers could not easily replace current employees with others, the employers might be willing to provide higher salary as incentives to keep those skilled employees. Therefore, we would expect that:

> H2: Job match has a positive effect on income.

In addition to the monetary rewards, job match also has an impact on the subjective outcomes such as job satisfaction. When workers' jobs match their needs and abilities, they are more likely to be satisfied with their work. On the other hand, when there is a mismatch between workers and their jobs, employees might develop negative behaviors and attitudes toward their jobs and work environment (Kalleberg 2008; Fleming & Kerr 2008; Tsang, et al. 1991). Therefore, we might expect that:

H3: Job match has a positive effect on job satisfaction.

III. Data and Research Method

.III-1. Data

The data used are from the Taiwan Education Panel Survey and Beyond (TEPS-B). This Panel data collection was conducted by National Chengchi University and Survey Research Center in Academia Sinica in October 2010. The data contains 3977 individuals born in 1984 and 1985. All of them have participated in the first wave(2001) and the second wave(2003) of TEPS(Taiwan Education Panel Survey) project. In addition to the demographic characteristics, the questionnaire contains retrospective information about respondents' education history and work history. We also collect information about their college experiences and current job characteristics. Since we are interested in the relationship between post-secondary educational resources and labor market performance, people with only high school degree or vocational high school degree (N=233) were excluded from our analysis. We also exclude self-employed persons, because their educational resources were not evaluated by employers.

.III-2. Measurement of Variables

A. Dependent variables

Person-job match. This is a dichotomous variable. It is measured by the subjective evaluation of job characteristic. Respondents were asked the following: "My job allows me to make full use of my knowledge and skills." The respondents were asked to evaluate the level of job match on a scale from 1("very much disagree") to 5("very much agree"). We recode "very much agree" and "somewhat agree" equal to 1, and other items equal to zero.

Job income. For the extrinsic job reward, we use monthly income as an indicator of current job income. In our regression models, the unit for income variable is in NT$ 1,000.

Job satisfaction. For the subjective job outcome, we use an overall measure of job satisfaction. Job satisfaction is assessed with the following question: "All in all, are you satisfied with your current job?" Individuals were asked to state their job satisfaction on a scale from 1("very dissatisfied") to 5("very satisfied").

B. Independent Variables

Educational resources. In our analysis, the respondents were asked the following: "During your college years (not including graduate programs) to what extent your undergraduate institution contributes to your knowledge or skills in the following area?" (1)Working effectively with others;(2)Learning effectively on your own;(3)Understanding yourself;(4)Understanding people of different cultural or ethnic backgrounds;(5)Solving real life problems;(6)Promoting your spirituality;(7)Clear and effective writing skills; (8)Clear and effective speaking skills; (9)Skills in critical and analytical thinking; (10)Skills in analyzing mathematical, scientific or statistical problems; (11)Using computer or information technology. Each of the 11 items has 4 answer categories, ranging from "very little"(score of 1) to "very much"(score of 4).

In order to construct a small number of hypothetical variables, these 11 questions relating to educational resources are factor analyzed using principal component analysis with oblique promax rotation. Table 1 shows that the analysis yields three factors. The first factor

is labeled social communicative resources due to the high loadings by item(1) to item(6). This first factor explains 33.78% of the variance. The second factor derived is labeled cultural resources by item(7), item(8), and item(9). The variance explained by factor 2 is 26.47%. The third factor include item(10), and item (11). This third factor explains 18.57% of the variance. Since the Cronbach's α value for the third factor is only 0.5, we treat these two items separately. We use item(10) to construct the quantitative resources. For item(11), we label it as computer resources.

[Table 1 about here]

In addition, we also include gender, educational attainment, firm size, and whether the job is belong to private or public sector as control variables. Table 2 provides coding and descriptive statistics for variables used in analyses.

[Table 2 about here]

III-3. Methods

In order to answer our research questions, we use logistic regression and ordinary least squares (OLS) regression models to predict job match and different job outcomes separately. Since job match is an intervening variable between educational resources and job outcomes, it will become both dependent and independent variables in different analysis. In order to understand the impacts of different educational resources on job match, we first use logistic regression to predict the log-odds of having a job to apply respondents' knowledge and skills. Then, with OLS regression analysis, we use job match and educational resources to predict monthly income. Thirdly, we predict job satisfaction by using educational resources, job match, and income. Since gender differences in the labor market behaviors are still prevalent

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in Taiwan, all of our analyses are divided into male and female groups. In testing our research hypotheses, we summarize the relationships among variables in Figure 3.

[Figure 3 about here]

IV. Research Findings

IV-1. Descriptive statistics

Table 2 presents a basic descriptive analysis for the research variables. We find that women tend to have higher level of job match than men. On average, 60% of women with post-secondary education can find a job allows her to apply her knowledge and skills. For men, it is only 52%. As for income and job satisfaction, there are no significant gender differences.

For educational attainment, we find that 40% of men go to four-year technical college or university (40%). In addition, there are 31% of men go to four-year college and 16% of men go to graduate school. For women, 42% of them go to four-year college, and 38% of them go to four-year technical college or university. We also find that 13% of women go to graduate school.

It is important to recognize that most of those four-year technical college or university students came from vocational high school. Before 1990, most of the vocational high school students entered the labor market immediately after graduation. But today, as shown in Figure 2, over 80% of vocational high school students pursue post-secondary education. With four more years of schooling, it is necessary to examine the impacts of college educational experiences on their labor market performances.

In this study, we specify 4 types of educational resources: (1)social communicative resources, (2)cultural resources, (3)quantitative resources, and (4)computer resources. We find that women tend to receive higher level of social communicative resources (2.61) than

men (2.48). Women also obtain more cultural resources (2.40) from college education than men (2.30). For men, they tend to receive higher level of quantitative resources (2.44) than women (2.09). As for computer resources, the gender gap between men (2.74) and women (2.70) is not obvious.

In order to further examine the relations between educational resources and fields of study, Table 3 presents the detailed educational resources and their average scores across fields of study. In order to visualize the different level of educational resources across college majors, we also compare 4 types of educational resources by 10 different fields of study in Figure 4.

[Table 3 about here]

[Figure 4 about here]

In Table 3 and Figure 4, we find that people trained in humanities, arts, teacher education tend to receive more social communicative cultural resources from their college education. At the same time, without surprise, they tend to obtain less quantitative resources. The similar patterns of obtaining educational resources can be seen in Communication field. For people who are educated in engineering, architecture, urban planning, and craft, they tend to receive high level of quantitative resources. The high score of quantitative resources can also be found in the fields of natural science, mathematics, information technology. As for computer resources, we find that people from different fields of study tend to have similar chances to access computer resources. People trained in humanities, arts, teacher education are not disadvantaged in receiving computer resources.

IV-2. Predicting Job Match and Employment Outcomes

A. Educational Resources and Job Match

Table 4 presents the results of the regression analysis for predicting log-odds of job match. In model 1, we find that, controlling for educational attainment and fields of study, women tend to have better chances to find a job allows them to apply their knowledge and skills. The odds of having a job match versus having a non-match job is 1.26 ($e^{0.23} = 1.26$) times higher for women than for men.   This result is consistent with the descriptive analysis in Table 2. Compared with graduating from a general four-year university, people with a graduate degree are more likely to find a job to apply their knowledge and skills. The effect of a graduate degree on job match is significant at $\alpha = 0.001$ level.

[Table 4 about here]

In order to examine the gender differences in determining the likelihood of job match, we further divide the total sample into male and female groups. In model 3, we find that, compared with women educated in the 4-year university, those women who graduate from four-year technical college or university are disadvantaged in job match.The negative effect of four-year technical college or university is significant at $\alpha = 0.1$ level.

In model 4 to model 6, we include social communicative resources as independent variable to predict the log-odds of job match. We find that social communicative resources increase the chance of finding a job to apply students' knowledge and skills after graduation. The positive and significant effect of social communicative resources on job match can be found in both men (model 5) and women (model 6) group. Our research hypothesis (H1a) can be supported by these research findings.

In model 7 to model 9, we include cultural resources as independent variable to predict the log-odds of job match. We find that cultural resources also increase the chance of finding a job to apply people's knowledge and skills after completing post-secondary education. The positive and significant effect of cultural resources on job match can be found in both men

(model 8) and women (model 9) group. These findings can support our research hypothesis (H1b).

In model 10 to model 12, we examine the effect of quantitative resources. We find that, only for men, the higher level of quantitative resources can improve the likelihood of job match. This effect for women is not significant. Our research hypothesis (H1c) can be supported by the research findings in the male group.

In model 13 to model 15, we include computer resources as independent variable to predict the log-odds of job match. We find that, for both men and women, receiving higher level of computer resources tends to increase the chance of finding a job to apply their knowledge and skills in the early career stage. These findings can support our research hypothesis (H1d).

Finally, in model 16 to model 18, we put four types of educational resource in the model at the same time. For male group in model 17, the most robust type of educational resources is social communicative resources. In addition to this variable, another variable significantly influencing men's job match is holding a graduate degree. For women, with the exception of quantitative resources, social communicative, cultural, and computer resources still have significant impacts on finding a job to apply their knowledge and skills.

B. Job Match and Income

Table 5 presents the OLS regression models for predicting current job income(in 1,000 dollars). In model 1, we find that there is a gender gap on income. Controlling educational attainment and majors, men tend to earn 1,250 dollars more than women in the labor market. For educational attainment, we find that those who graduated from a 4-year technical college or university tend to earn less than their counterparts from a general 4-year university. In addition, young people with a graduate degree tend to earn more than those who have a degree from the general 4-year university.

In terms of major, we find that those who were trained in Social science/Psychology/Law, Medical/Health, Engineering/Architecture/Urban Planning/Craft, and Military/Police/Sports tend to earn more than those who educated in Business/Administration.

In model 2, we find that, for men, the negative effect of 4-year technical college or university on income is not significant. However, in model 3, we find that the negative effect of 4-year technical college or university is mainly for women. We also find that, compared with women having a degree from the general 4-year university, those women who obtain a graduate degree do not have a positive impact on income.

For college major, in model 3, we find that young women educated in the medical or health professions tend to earn more than their counterparts who were trained in the fields of business or administration. As for social communicative resources, we find that, the effect is not significant for both men and women.

[Table 5 about here]

In model 4 to model 6, we replace social communicative resources with cultural resources. For women group (in model 6), the cultural resources variable has a positive impact on income. In model 7 to model 9, we examine the effects of quantitative resources on income. We find that, for women (in model 9), quantitative resources have a positive effect on income. In model 10 to model 12, we include computer resources to predict income. We find that computer resources have no impact on income.

In model 13 to model 15, we put four types of educational resources in the models at the same time. We find that, for women (in model 15), quantitative resources have a positive effect on income, but, computer resources have a negative effect on income.

In model 16 to model 18, we include weekly working hours to predict income. We find that working hours also has a positive effect on income. In addition, we also find that young

people studying in Humanities/Arts/Teacher Education tend to earn more than those who educated in Business/Administration. In order to understand why the effect of Humanities/Arts/Teacher Education becomes significant after controlling for working hours, we did extra analysis (not shown here). We found that the working hours are much shorter for young people who were trained in the fields of Humanities/Arts/Teacher Education than others. We suspect that young people in these fields are less likely to find a full-time job than their counters in Business/Administration. Therefore, if they can work as long as others, they will have higher income than those who were educated in Business/Administration. We find that, compared with working in the small firms with less than 10 employees, larger firms tend to provide better monetary reward. Weekly working hours also has a positive effect on income.

Finally, we include firm size and job match variable in model 19 to model 21. We find that, compared with working in the small firms with less than 10 employees, larger firms tend to provide better monetary reward. In addition, for both man and women, job match has a positive effect on income. Our research hypothesis (H2) can be supported by these research findings.

C. Job Match and Job Satisfaction

Table 6 shows the results of regression models for predicting job satisfaction. In model 1 to model 3, men with a graduate degree are more satisfied with their job than those who were educated in the four-year university. We also find that, for both men and women, social communicative resources have a positive and significant effect on job satisfaction.

[Table 6 about here]

In model 4 to model 6, we find that cultural resources also have positive impacts on job satisfaction. In model 7 to model 9, the results show that women's quantitative resources

have a positive effect on job satisfaction. In model 10 to model 12, the computer resources are not related to the job satisfaction for both men and women.

In model 13 to model 15, we include all kinds of educational resources simultaneously. We find that the effects of social communicative resources are still positive and significant for both men and women groups. At the same time, model 14 shows that the effect size of quantitative resources increase (from -0.05 to -0.10**) and become significant at α =0.01 level. In our extra analysis (not shown here), we suspect that the negative relationship between quantitative resources and job satisfaction has been suppressed by social communicative resources.

In model 16 to model 18, we include several job characteristics as control variables. We find that working hours tend to reduce job satisfaction for men and women. As for firm size and sector, we find that working in a small firm with less than 10 employees, men are more satisfied with their jobs than in other workplaces. For women, the only place to improve job satisfaction is the public sector. We find that there is a gender difference in the effects of public sector on job satisfaction. Unlike women, those men who are working in the public sector tend to be less satisfied with their jobs than those who working in the private sector. It suggests that the public sector provides a more friendly work environment for women than the private sector. In terms of income, the effects on job satisfaction are positive for men and women.

In model 18, we find that, controlling for job characteristics such as working hours, firm size, and income, those women who graduated from a four-year technical college or university are more satisfied with their jobs than their counterparts with a general four-year university degree. It suggests that these two groups of women tend to receive different labor market opportunities. As shown in our previous income analysis in Table 5, for women, those who graduated from the general four-year university tend to earn 3,200 dollars more than those who educated in a four-year technical college or university.

Finally, in model 19 to model 21, we include job match to predict job satisfaction. We find that job match has a positive and significant effect on job satisfaction for both men and women. Our research hypothesis (H3) can be supported by these results. In model 20, for men, we find that the effect of graduate school on job satisfaction decreases after including job match. Combined with the results of job match in Table 4, it suggests that young men with a graduate degree are more satisfied with their jobs mainly because they have better chances to find a job which allows them to apply their knowledge and skills. The effect of working hours also disappears after controlling for job match. It suggests that, in addition to monetary reward, being able to apply knowledge and skills plays an important role in determining young men's work attitude.

One interesting finding in model 21 is that, controlling for job match, those women who are trained in medical and health fields are less satisfied with their jobs than their counterparts in the fields of business and administration. From our previous logistic analysis for job match in Table 4, these women are most likely to stay in the field after graduation than others. This low level of job satisfaction suggests that the work environment for women in medical and health professions need to do some adjustments.

V. Conclusion and Discussion

Since 1990s, Taiwanese government approved the expansion of higher education in order to respond to the educational demands of citizens. One of the most important educational policies is to help the previous five-year junior colleges upgrading to the four-year technical colleges. At the same time, the government also promoted those four-year technical colleges into the four-year technical universities. The immediate result of educational expansion is to increase the years of education for the young generation. Today, over 80% of vocational high school students are able to pursue post-secondary education. However, this rapid growth of educational attainment also brings some problems for

adolescents' job opportunities. Because of the gap between the demand for and supply of labor force, one of the key issues is that some highly educated adolescents might have a job, but they are not able to apply their knowledge and skills in the work place. Some other adolescents even become NEET (not in employment, education or training) and create a burden for their families and the whole society.

From the institutional perspective, we use a concept of field-related educational resources in this study. We asked the respondents to evaluate the levels of different educational resources they received from their college experience. We specify four types of educational resources: (1) social communicative resources, (2) cultural resource, (3) quantitative resources, and (4) computer resources. Then, we systematically examine the effects of educational resources on job match, income, and job satisfaction. We find that social communicative resources have a robust impact on job match for both men and women. For women, cultural resources and computer resources also play important roles in helping them to find a job to apply their knowledge and skills. In terms of employment outcomes, we find that job match has positive effects on income and job satisfaction. We also find that social communicative resources have a positive impact on job satisfaction.

Our research findings can provide some important insights for students and educational policy makers. For students in the post-secondary institutions, they might need to construct a learning strategy in order to prepare for the uncertain labor market after graduation. Not only focusing on the cognitive learning in the fields of study, college students also need to pay attention on the non-cognitive learning experiences. Our findings show that social communicative resources play an important role for individual's career development. For policy makers, they need to construct a school environment which could help students to access different kinds of knowledge, skill, and learning experience.

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Figure 1. Changes in Number of Junior Colleges and Universities
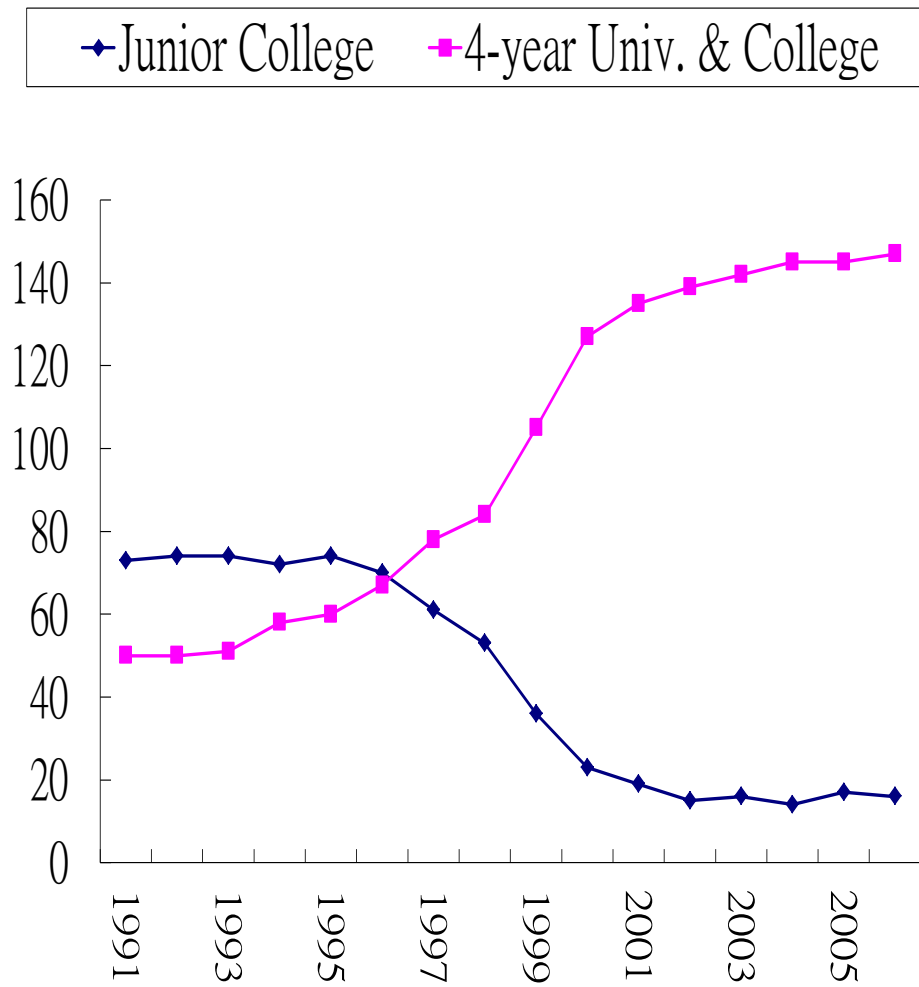
Source: Ministry of Education, Taiwan

**Figure 2. Changes in the Rates of Entering Higher Education
Source: Ministry of Education, Taiwan**
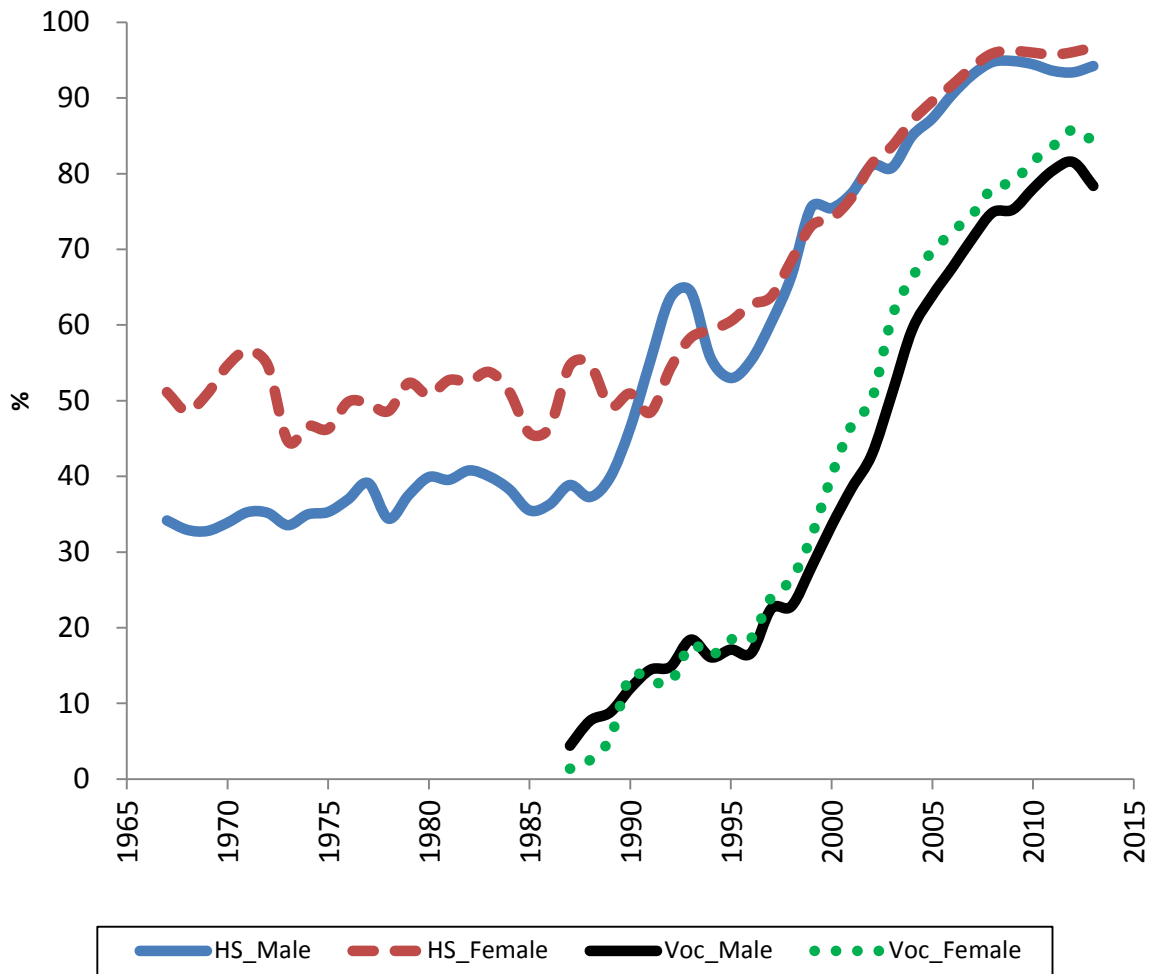
Figure 3. A Research Model
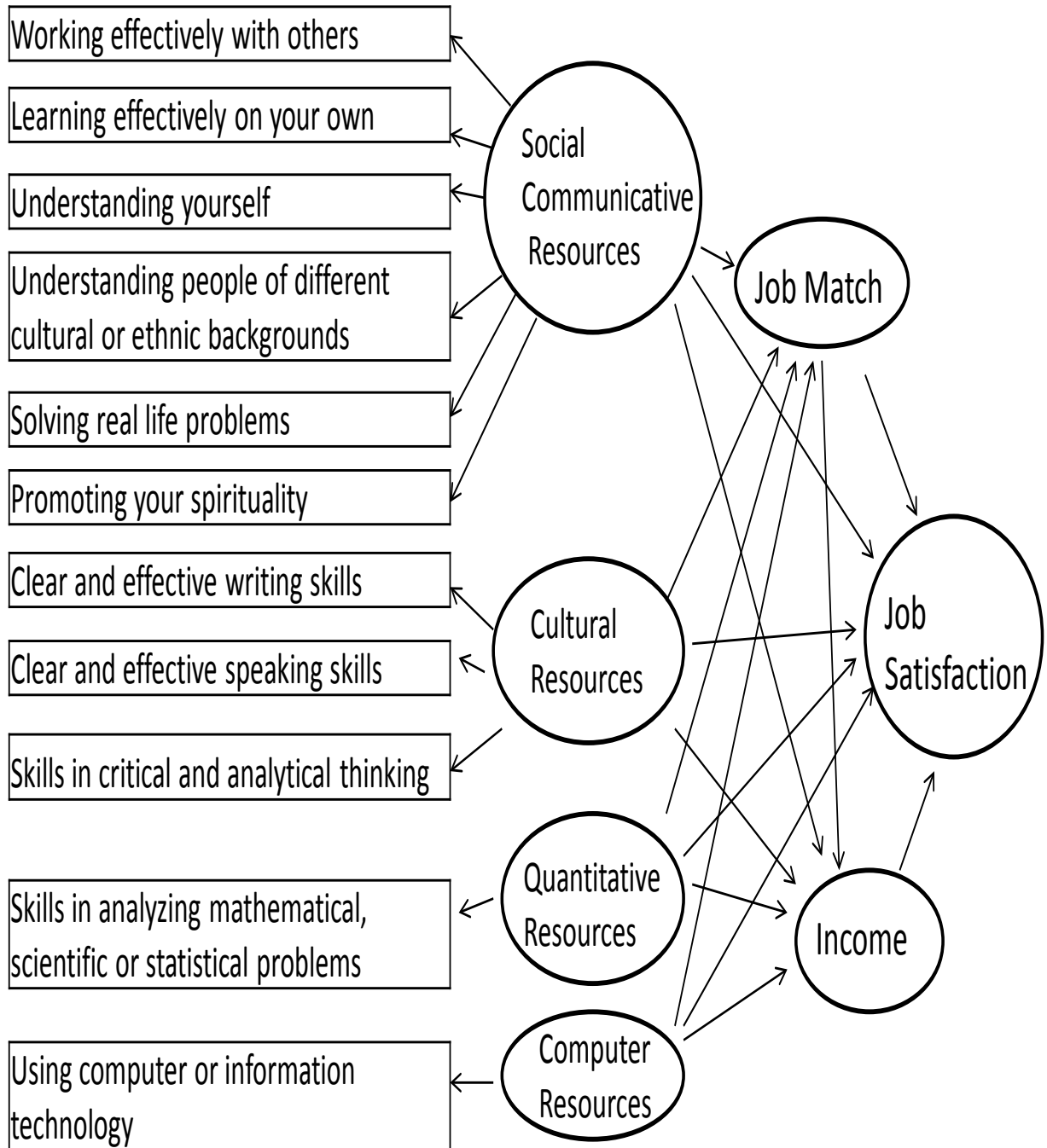
Figure 4. Educational Resources by Fields of Study

- Social communicative resources
- Cultural resources
- Quantitative resources
- Computer resources

Fields of study: Humanities/arts/education, Social science/psycho./law, Business/admin., Natural sci./math./IT, Medical/health, Engineer/arch./Urban plan/craft, Agriculture /home eco., Transport/Telecom./tourist, Communication, Military/police/sport
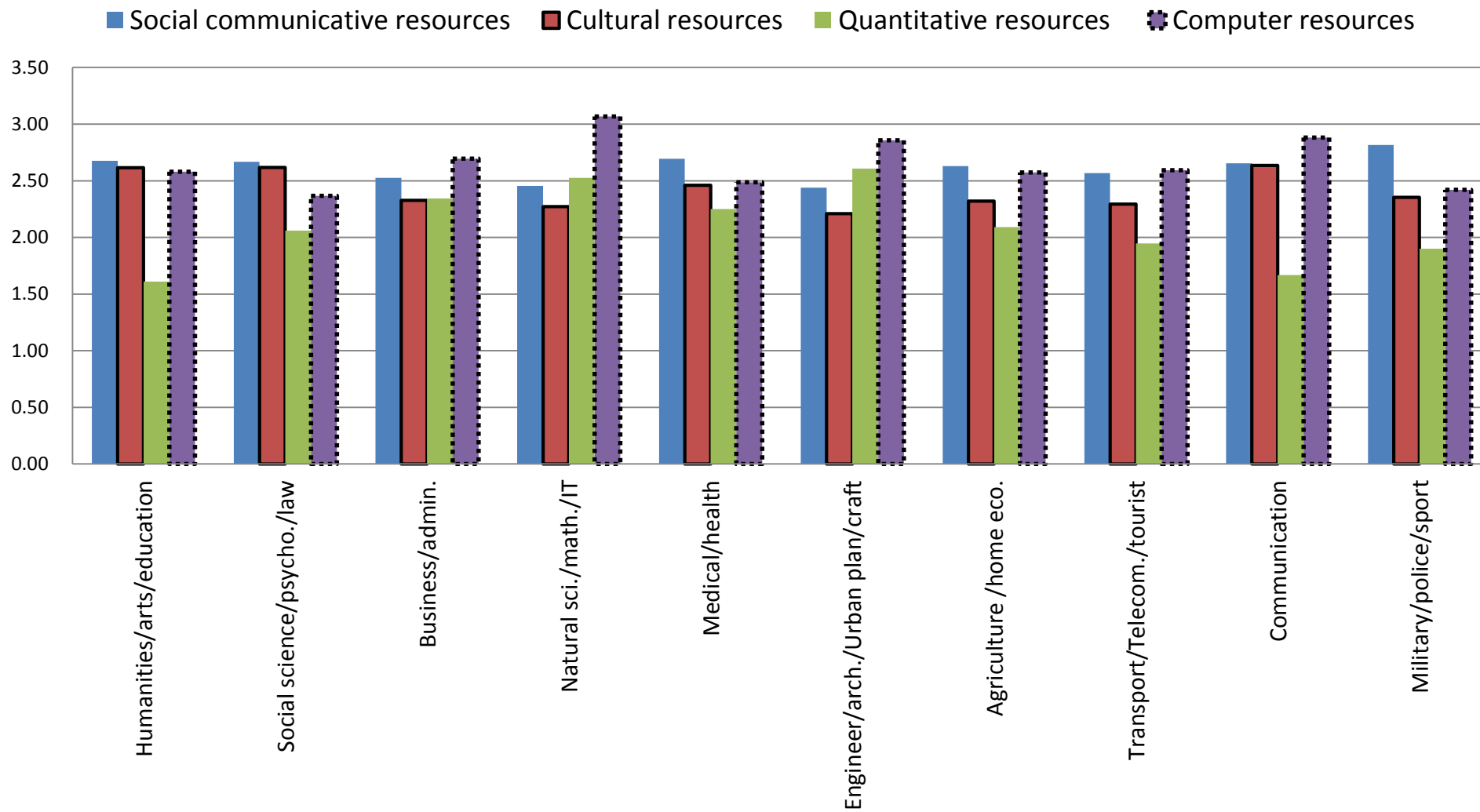
Table 1. Factor Analysis of Individual Reports on Educational Resources

Variable	Factor 1	Factor 2	Factor 3
1. Working effectively with others.	0.4171		
2. Learning effectively on your own.	0.5876		
3. Understanding yourself.	0.7978		
4. Understanding people of different cultural or ethnic backgrounds.	0.7156		
5. Solving real life problems.	0.7929		
6. Promoting your spirituality.	0.7742		
7. Clear and effective writing skills.		0.8974	
8. Clear and effective speaking skills.		0.8560	
9. Skills in critical and analytical thinking.		0.5163	
10. Skills in analyzing mathematical, scientific or statistical problems.			0.8580
11. Using computer or information technology.			0.7518
Eigenvalue	4.20	1.27	1.03
Cronbach's α	0.81	0.72	0.50

Source: TEPS-B 2010　(N= 3548)

Table 2. Description of Variables

Variables	Description	(I)Taiwan- Male Mean	(SD)	(II)Taiwan-Female Mean	(SD)
I. Dependent Var.					
Job Match	My job allows me to make full use of my knowledge and skills. 1= very much agree , or somewhat agree ; 0=others	**0.52**	0.50	**0.60**	0.49
Job Satisfaction	Are you satisfied with your current job? 5= very satisfied ; 4= satisfied 3= Neither satisfied nor dissatisfied ; 2= Dissatisfied ; 1= Very dissatisfied	**3.56**	0.90	**3.57**	0.87
Job Income	What is the average monthly income of this current job? (NT$)	**30,723.88**	13,257.24	**29,230.57**	11,687.43
II. Independent Variables					
Educational attainment	What is your highest education level (including the level you are currently completing)?				
	(1)Five-year junior college	**0.06**	0.23	**0.04**	0.19
	(2)Two-year junior college	**0.07**	0.25	**0.03**	0.17
	(3)Four-year technical college or university	**0.40**	0.49	**0.38**	0.49
	(4)Four-year college	**0.31**	0.46	**0.42**	0.49
	(5)Graduate school(Master/PhD)	**0.16**	0.37	**0.13**	0.34
Major	Field of study in post-secondary education				
	(1)Humanities/Arts/Teacher education	**0.06**	0.23	**0.21**	0.40
	(2)Social science/Psychology/Law	**0.03**	0.18	**0.08**	0.27
	(3)Business/Administration	**0.16**	0.37	**0.33**	0.47
	(4)Natural science/Mathematics/IT	**0.15**	0.35	**0.10**	0.29
	(5)Medical/Health	**0.03**	0.16	**0.08**	0.27
	(6)Engineering/Architecture/Urban planning/Craft	**0.49**	0.50	**0.06**	0.24
	(7)Agriculture/Home economics	**0.02**	0.14	**0.07**	0.25
	(8)Transportation/Telecommunication/Tourist	**0.03**	0.17	**0.04**	0.19
	(9)Communication	**0.02**	0.12	**0.03**	0.18
	(10)Military/Police/Sports	**0.02**	0.13	**0.01**	0.11
Educational Resources	During your college years (not including graduate programs) to what extent your undergraduate institution contributes to your knowledge or skills in the following areas? 4=very much; 3= quite a bit; 2=somewhat; 1=very little				

(I)Social Communicative resources	Average of scores of following 6 items: (1)Working effectively with others. (2)Learning effectively on your own. (3)Understanding yourself. (4)Understanding people of different cultural or ethnic backgrounds. (5) Solving real life problems. (6) Promoting your spirituality.	**2.48**	0.58	**2.61**	0.59
(II) Cultural resources	Average of scores of following 3 items: (7)Clear and effective writing skills. (8)Clear and effective speaking skills. (9)Skills in critical and analytical thinking.	**2.30**	0.65	**2.40**	0.65
(III)Quantitative resources	(10)Skills in analyzing mathematical, scientific or statistical problems.	**2.44**	0.87	**2.09**	0.85
(IV)Computer resources	(11)Using computer or information technology.	**2.74**	0.88	**2.70**	0.86
Job Characteristic					
Working hours/week	Working hours per week	**50.05**	16.59	**45.01**	12.18
Firm size & sector	Number of employees in the workplace: (1)1-9	**0.20**	0.40	**0.17**	0.37
	(2) 10-99	**0.26**	0.44	**0.32**	0.47
	(3) 100-499	**0.15**	0.36	**0.14**	0.34
	(4) 500-1000 or more	**0.29**	0.45	**0.25**	0.43
	(5) Government	**0.11**	0.31	**0.13**	0.34
N		1263		1545	

[a] Source: TEPS-B 2010

Table 3.   Average Scores on 4 Types of Educational Resources, by Field of Study

Educational Resources \ Field of Study	Humanity /arts /education	Social science /psych. /law	Business /admin.	Natural sci. /math. /IT	Medical /health	Engineer /Archit. /Urban plan /craft	Agriculture/ home eco.	Transport /Telecom. /tourist	Communication	Military /police /sport
(I)Social communicative resources (mean)	**2.68**	**2.67**	**2.53**	**2.45**	**2.69**	**2.44**	**2.63**	**2.57**	**2.65**	**2.82**
(1)Working effectively with others.	3.00	2.96	2.98	2.90	3.15	2.84	3.05	3.03	3.19	3.22
(2)Learning effectively on your own.	3.01	2.97	2.85	2.84	3.09	2.76	2.91	2.88	2.98	3.22
(3)Understanding yourself.	2.61	2.66	2.46	2.38	2.59	2.34	2.60	2.43	2.51	2.86
(4)Understanding people of different cultural or ethnic backgrounds.	2.80	2.71	2.50	2.39	2.57	2.46	2.54	2.65	2.74	2.84
(5)Solving real life problems.	2.21	2.31	2.22	2.12	2.47	2.18	2.37	2.31	2.18	2.50
(6)Promoting your spirituality.	2.41	2.38	2.15	2.09	2.31	2.06	2.32	2.10	2.33	2.34
(II)Cultural resources (mean)	**2.61**	**2.62**	**2.33**	**2.27**	**2.46**	**2.21**	**2.32**	**2.29**	**2.63**	**2.35**
(7)Clear and effective writing skills.	2.50	2.35	1.99	1.96	2.21	1.92	2.02	1.93	2.54	2.08
(8)Clear and effective speaking skills.	2.77	2.65	2.45	2.30	2.46	2.21	2.39	2.54	2.69	2.54
(9)Skills in critical and analytical thinking.	2.57	2.85	2.54	2.55	2.70	2.50	2.55	2.42	2.68	2.47
(III)Quantitative resources: (10)Skills in analyzing mathematical, scientific or statistical problems.	**1.61**	**2.06**	**2.34**	**2.52**	**2.25**	**2.61**	**2.09**	**1.95**	**1.67**	**1.90**
(IV) Computer resources: (11)Using computer or information technology.	**2.58**	**2.37**	**2.69**	**3.07**	**2.49**	**2.86**	**2.57**	**2.59**	**2.88**	**2.42**
Total (N=3393)	14%	6%	24%	13%	6%	26%	5%	3%	2%	1%

Source: TEPS-B 2010

Table 4. Logistic Regression for Predicting log-odds of Job Match (vs. others)

Variable	Model 1 Total	Model 2 Male	Model 3 Female	Model 4 Total	Model 5 Male	Model 6 Female	Model 7 Total	Model 8 Male	Model 9 Female	Model 10 Total	Model 11 Male	Model 12 Female	Model 13 Total	Model 14 Male	Model 15 Female	Model 16 Total	Model 17 Male	Model 18 Female
Female	0.23*	---	---	0.22*	---	---	0.26**	---	---	0.25**	---	---	0.21*	---	---	0.21*	---	---
Educational attainment																		
5-yr junior college.	-0.26	-0.1	-0.46	-0.18	-0.02	-0.38	-0.19	-0.03	-0.42	-0.25	-0.06	-0.46	-0.23	-0.07	-0.44	-0.16	0	-0.37
2-yr junior college.	-0.07	0.2	-0.45	0.04	0.33	-0.34	0.09	0.31	-0.23	-0.04	0.24	-0.44	-0.02	0.24	-0.41	0.09	0.35	-0.28
4-yr technical coll. or univ.	-0.12	0	-0.21+	-0.11	0.01	-0.2	-0.09	0.02	-0.16	-0.11	0.02	-0.21+	-0.14	-0.02	-0.23+	-0.11	0.01	-0.19
4-yr university	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Master/PH.D	0.81***	0.97***	0.68***	0.77***	0.92***	0.65***	0.78***	0.96***	0.64***	0.79***	0.94***	0.67***	0.79***	0.94***	0.68***	0.77***	0.91***	0.66***
Major (vs. Business/admin.)																		
Humanities/arts/education	0.46***	0.63*	0.39**	0.39**	0.57+	0.33*	0.35**	0.52+	0.27+	0.52***	0.75*	0.41**	0.49***	0.67*	0.43**	0.32*	0.58+	0.19
Social science/psycho./law	0.14	0.51	-0.03	0.08	0.37	-0.05	0.06	0.4	-0.1	0.17	0.56	-0.02	0.22	0.58	0.06	0.08	0.39	-0.07
Natural sci./math./IT	0.09	0.23	-0.02	0.14	0.29	0	0.13	0.27	0	0.09	0.21	-0.02	0.01	0.15	-0.11	0.11	0.26	-0.04
Medical/health	1.15***	0.73+	1.30***	1.08***	0.61	1.25***	1.11***	0.71+	1.25***	1.16***	0.73+	1.30***	1.20***	0.78*	1.36***	1.10***	0.64	1.25***
Engineer/arch./Urban plan/craft	0.06	0.11	-0.06	0.1	0.14	-0.02	0.13	0.16	0.04	0.05	0.07	-0.06	0.02	0.07	-0.11	0.11	0.13	0
Agriculture /home eco.	0.01	-0.27	0.06	-0.04	-0.3	0	0	-0.3	0.07	0.02	-0.26	0.06	0.04	-0.27	0.1	-0.02	-0.31	0.03
Transport/Telecom./tourist	-0.09	-0.35	0.08	-0.13	-0.46	0.08	-0.1	-0.37	0.07	-0.05	-0.3	0.1	-0.06	-0.33	0.11	-0.14	-0.43	0.03
Communication	0.15	0.5	-0.02	0.07	0.51	-0.13	0.02	0.45	-0.19	0.2	0.57	0	0.11	0.48	-0.07	-0.03	0.5	-0.33
Military/police/sport	0.51	0.71	0.28	0.34	0.46	0.19	0.51	0.73	0.24	0.56+	0.85+	0.28	0.58+	0.82+	0.25	0.39	0.57	0.18
Educational Resources																		
Social communicative resources				0.52***	0.52***	0.53***										0.36***	0.43***	0.30*
Cultural resources							0.42***	0.32***	0.50***							0.21**	0.07	0.34**
Quantitative resources										0.08+	0.15*	0.03				-0.07	0.03	-0.14+
Computer resources													0.22***	0.19**	0.25***	0.11*	0.06	0.16*
Constant	-0.09	-0.24	0.25*	-1.41***	-1.54***	-1.12***	-1.09***	-1.02***	-0.93***	-0.30+	-0.62**	0.19	-0.66***	-0.73**	-0.43*	-1.64***	-1.72***	-1.41***
-2 Log-likelihood	3652.16	1696.14	2016.46	3666.68	1671.54	1982.92	3680.98	1684.22	1983.44	3721.18	1691.52	2016.30	3701.60	1688.30	2000.96	3653.58	1669.82	1876.72
Chi-square(df)	125.8(14)	52.713)	68.7(13)	183.3(15)	77.3(14)	102.2(14)	169.0(15)	64.6(14)	101.7(14)	128.8(15)	57.3(14)	68.8(14)	148.4(15)	60.5(14)	84.2(14)	196.4(18)	79.0(17)	118.4(17)
Observations	2808	1263	1545	2808	1263	1545	2808	1263	1545	2808	1263	1545	2808	1263	1545	2808	1263	1545

+: $p < 0.10$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

Source: TEPS-B 2010

Table 5.   OLS Regression for Predicting Job Income ($1,000)

Variable	Model 1 Total	Model 2 Male	Model 3 Female	Model 4 Total	Model 5 Male	Model 6 Female	Model 7 Total	Model 8 Male	Model 9 Female	Model 10 Total	Model 11 Male	Model 12 Female	Model 13 Total	Model 14 Male	Model 15 Female	Model 16 Total	Model 17 Male	Model 18 Female	Model 19 Total	Model 20 Male	Model 21 Female
Female	-1.25*	---	---	-1.21*	---	---	-1.18*	---	---	-1.20*	---	---	-1.07+	---	---	-0.01	---	---	-0.29	---	---
Educational attainment																					
5-yr junior college.	-1.76	-2.26	-0.54	-1.72	-2.21	-0.57	-1.77	-2.34	-0.68	-1.88	-2.29	-0.72	-1.72	-2.3	-0.61	-2.42*	-2.64	-1.68	-1.19	-1.84	-0.08
2-yr junior college.	-1.53	0.15	-3.89*	-1.34	0.22	-3.49+	-1.45	0.09	-3.46+	-1.68	0.12	-4.09*	-1.27	0.15	-3.08	-2.67*	-0.71	-5.05**	-1.88+	-0.63	-3.00+
4-yr technical coll. or univ.	-2.74***	-1.35	-3.75***	-2.69***	-1.35	-3.66***	-2.70***	-1.38	-3.67***	-2.70***	-1.32	-3.72***	-2.57***	-1.32	-3.47***	-3.02***	-1.54+	-4.11***	-2.38***	-1.21	-3.20***
4-yr university	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Master/PH.D	1.54*	3.59**	0	1.51+	3.55**	-0.03	1.50+	3.66**	-0.09	1.62*	3.62**	0.06	1.48+	3.67**	-0.18	3.42***	5.47***	1.87+	1.78*	3.89***	0.31
Major (vs. Business/admin.)																					
Humanities/arts/education	1.22	2.97	0.53	1.08	2.9	0.33	1.59+	2.72	1.4	1.23	2.91	0.56	1.29	2.52	1.04	2.35**	3.61*	1.91*	2.29**	3.32+	2.24*
Social science/psycho./law	2.63*	5.46*	1.51	2.55*	5.38*	1.4	2.81*	5.34*	1.87	2.56*	5.35*	1.39	2.42*	5.14*	1.43	2.43*	4.67*	1.43	2.13*	3.27	1.83
Natural sci./math./IT	1	2.40+	0	1.05	2.43+	0.04	0.94	2.45+	-0.07	1.09	2.50+	0.11	1.28	2.60+	0.31	0.59	2.06	-0.45	0.5	1.41	0.02
Medical/health	4.13***	5.27+	3.39**	4.10***	5.24+	3.33**	4.26***	5.21+	3.67**	4.14***	5.18+	3.44**	4.01***	5.16+	3.34**	4.03***	5.13*	3.32**	2.32*	3.68	1.49
Engineer/arch./Urban plan/craft	1.87*	2.58*	1.39	1.96*	2.61*	1.55	1.78*	2.66*	1.34	1.89*	2.62*	1.4	2.03**	2.77*	1.73	1.62*	2.49*	0.72	1.23+	1.93+	0.7
Agriculture /home eco.	-0.91	-3.02	-0.69	-0.86	-3.03	-0.58	-0.78	-3.03	-0.36	-0.91	-3.03	-0.68	-0.88	-3.06	-0.5	-0.7	-2.65	-0.45	-0.06	-2.1	0.47
Transport/Telecom./tourist	1.18	1.33	1.51	1.2	1.32	1.49	1.39	1.19	1.96	1.19	1.3	1.48	1.34	1.19	1.88	0.57	0.02	1.4	1.11	0.59	1.8
Communication	0.11	-0.11	-0.1	-0.07	-0.15	-0.39	0.44	-0.27	0.74	0.24	-0.08	0.13	0.32	-0.32	0.57	-0.5	1.27	-1.05	0.67	1.53	0.77
Military/police/sport	6.04**	10.17**	2.25	6.16**	10.14**	2.26	6.41**	9.83**	2.47	6.12**	9.99**	2.47	6.17**	9.76**	2.36	4.97*	7.91*	1.79	4.14*	6.20*	2
Educational Resources																					
Social communicative resources	0.4	-0.09	0.68										0.11	-0.1	0.21	0.01	-0.27	0.23	-0.34	-0.37	-0.32
Cultural resources				0.75+	0.17	1.15*							0.79	0.48	0.97	0.87+	0.62	0.97+	0.67	0.41	0.8
Quantitative resources							0.41	-0.31	1.00*				0.42	-0.32	1.03*	0.23	-0.47	0.76+	0.13	-0.7	0.83*
Computer resources										-0.31	-0.24	-0.37	-0.64*	-0.23	-0.88*	-0.41	0.13	-0.75+	-0.45	0.15	-0.84*
Working hours/week (ln)																15.06***	16.10***	14.01***	14.63***	15.23***	13.99***
Firm size & sector [vs.(1-9)]																					
10-99																			2.43***	1.96+	2.89***
100-499																			4.49***	3.81**	5.06***
500-1000 +																			8.05***	6.66***	9.24***
government																			7.14***	6.55***	7.61***
Job match																			2.80***	2.10**	3.30***
Constant	29.55***	28.99***	28.63***	28.75***	28.37***	27.63***	29.53***	29.52***	27.99***	31.35***	29.38***	31.39***	28.98***	29.26***	27.47***	-29.12***	-33.55***	-25.14***	-31.53***	-33.17***	-30.43***
Observations	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411
R-squared	0.03	0.03	0.04	0.03	0.03	0.04	0.03	0.04	0.04	0.03	0.03	0.04	0.04	0.04	0.05	0.15	0.17	0.14	0.21	0.21	0.23

+: $p < 0.10$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$ Source: TEPS-B 2010

Table 6.   OLS Regression for Predicting Job Satisfaction

Variable	Model 1 Total	Model 2 Male	Model 3 Female	Model 4 Total	Model 5 Male	Model 6 Female	Model 7 Total	Model 8 Male	Model 9 Female	Model 10 Total	Model 11 Male	Model 12 Female	Model 13 Total	Model 14 Male	Model 15 Female	Model 16 Total	Model 17 Male	Model 18 Female	Model 19 Total	Model 20 Male	Model 21 Female
Female	-0.01	---	---	0	---	---	0	---	---	0	---	---	-0.01	---	---	-0.01	---	---	-0.02	---	---
Educational attainment																					
5-yr junior college.	0.15+	0.17	0.14	0.13	0.16	0.12	0.12	0.13	0.1	0.12	0.14	0.11	0.15+	0.15	0.14	0.17*	0.16	0.2	0.18*	0.14	0.22+
2-yr junior college.	0.03	0.07	-0.04	0.03	0.06	-0.01	0	0.01	-0.03	-0.01	0.03	-0.08	0.03	0.06	0	0.05	0.05	0.1	0.04	0.02	0.11
4-yr technical coll. or univ.	0.02	0.01	0.03	0.03	0.02	0.04	0.02	0.01	0.04	0.01	0.01	0.03	0.02	0.01	0.05	0.06	0.01	0.12*	0.07+	0	0.13*
4-yr university	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Master/PH.D	0.15**	0.21*	0.09	0.16**	0.23**	0.1	0.17**	0.26**	0.1	0.17**	0.24**	0.11	0.15**	0.23**	0.08	0.11+	0.20*	0.01	0.06	0.11	-0.02
Major (vs. Business/admin.)																					
Humanities/arts/education	0.03	0.03	0.04	0.03	0.03	0.03	0.08	0.03	0.12+	0.06	0.07	0.06	0.01	-0.06	0.07	-0.04	-0.05	-0.02	-0.06	-0.09	-0.02
Social science/psycho./law	0	0.03	-0.01	0	0.06	-0.02	0.02	0.08	0.02	0.02	0.11	0	-0.03	-0.02	-0.01	-0.06	0.02	-0.07	-0.05	-0.01	-0.05
Natural sci./math./IT	0	-0.02	0.01	-0.01	-0.02	0.01	-0.02	-0.03	0	-0.03	-0.05	0	0.01	0	0.03	0.01	0.04	0.04	0.01	0.02	0.04
Medical/health	-0.11	-0.15	-0.1	-0.09	-0.1	-0.09	-0.07	-0.11	-0.06	-0.07	-0.09	-0.07	-0.12	-0.17	-0.1	-0.16+	-0.17	-0.16+	-0.23**	-0.23	-0.21*
Engineer/arch./Urban plan/craft	-0.01	-0.02	0.1	0	-0.02	0.11	-0.02	-0.02	0.09	-0.02	-0.04	0.08	0.01	0.01	0.12	0	0.01	0.13	0	0	0.13
Agriculture /home eco.	-0.01	0.07	-0.03	0.01	0.08	-0.01	0.01	0.08	0.01	0.01	0.09	-0.01	-0.02	0.07	-0.02	-0.03	0.06	-0.03	-0.02	0.07	-0.03
Transport/Telecom./tourist	-0.11	-0.04	-0.17	-0.1	0	-0.17	-0.09	-0.02	-0.13	-0.1	0	-0.17	-0.12	-0.08	-0.15	-0.11	-0.07	-0.16	-0.09	-0.02	-0.15
Communication	-0.13	0.1	-0.21	-0.14	0.09	-0.23+	-0.08	0.09	-0.12	-0.1	0.11	-0.18	-0.14	0.04	-0.17	-0.13	0	-0.13	-0.12	-0.02	-0.11
Military/police/sport	-0.12	-0.03	-0.2	-0.05	0.07	-0.17	-0.03	0.02	-0.15	-0.04	0.08	-0.16	-0.13	-0.14	-0.2	-0.19	-0.06	-0.32	-0.21	-0.11	-0.31
Educational Resources																					
Social communicative resources	0.19***	0.20***	0.18***										0.19***	0.22***	0.16**	0.19***	0.21***	0.15**	0.16***	0.17**	0.13**
Cultural resources				0.12***	0.10*	0.14***							0.04	0.04	0.04	0.03	0.05	0.03	0.02	0.04	0.01
Quantitative resources							0.02	-0.05	0.08**				-0.01	-0.10**	0.06+	-0.01	-0.09*	0.05+	0	-0.09**	0.07*
Computer resources										0.02	0.03	0.02	-0.03	0	-0.04	-0.03	-0.01	-0.04	-0.04+	-0.02	-0.05+
Working hours/week (ln)																-0.33***	-0.20*	-0.41***	-0.27***	-0.14	-0.36***
Firm size & sector [vs.(1-9)]																					
10-99																-0.19***	-0.31***	-0.09	-0.18***	-0.32***	-0.07
100-499																-0.19**	-0.32***	-0.05	-0.18**	-0.31***	-0.03
500-1000 +																-0.21***	-0.30***	-0.11	-0.17**	-0.28***	-0.07
government																-0.1	-0.47***	0.18*	-0.09	-0.47***	0.20*
Income($1,000)																0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
Job match																			0.34***	0.42***	0.27***
Constant	3.06***	3.03***	3.07***	3.25***	3.28***	3.22***	3.48***	3.63***	3.35***	3.48***	3.45***	3.49***	3.08***	3.14***	3.01***	4.16***	3.88***	4.25***	3.95***	3.67***	4.03***
Observations	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411	2553	1142	1411
R-squared	0.02	0.03	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.03	0.05	0.07	0.07	0.08	0.11	0.09

+: $p < 0.10$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$ Source: TEPS-B 2010