

# The Relationship between Vocational High School Students Studying in their Field of Specialization, and their Development after Graduation

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This study explores the career choices of second-year high school students in the vocational education system. Specifically it relates specialist fields of study, the “most desirable areas after graduation”, and “development after graduation”. This study draws the necessary information from the long-term follow-up database of secondary education in Taiwan, and analyses the card-side verification. The explanatory variables are “the areas most desirable after graduation” and “development after graduation”, both of which are variable categories. The results of statistical analysis show that second-year students of the vocational system are continuing to pursue further studies or direct employment after graduation. Most choose to study in a speciality, except for the “other fields” in this area. Specialities for students are selected for post-graduation. The influence of continuing career planning or direct employment career planning is low.

**Key words:** *Vocational high school, higher education, employment, specialist field.*

## Introduction

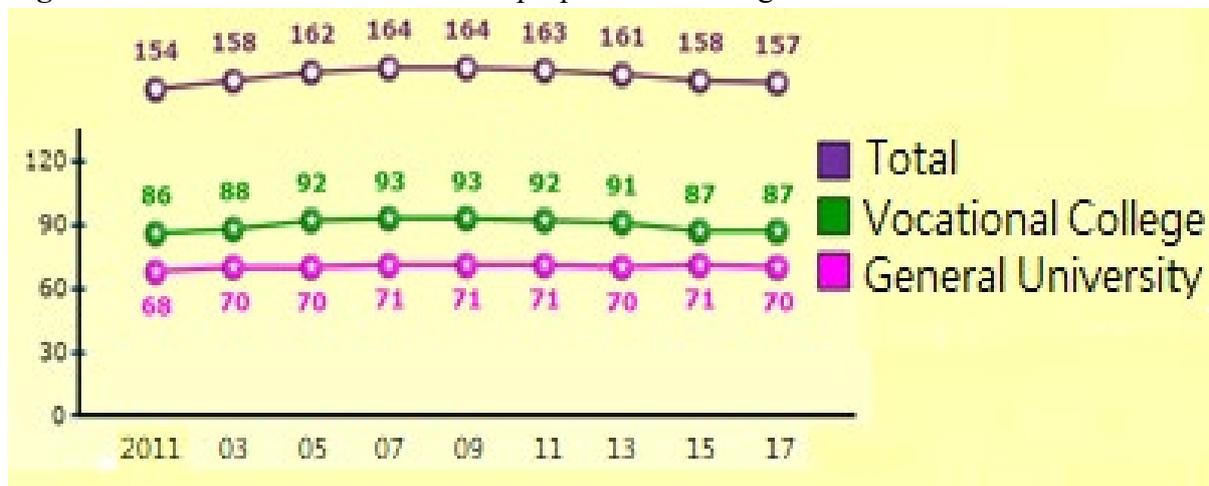
The birth-rate is declining and vocational colleges are expanding considerably. Accordingly, the rates of vocational high school graduates enrolment in higher education have increased yearly. The year 2018 showed an enrolment rate of 77.4% and a direct employment rate of 16.2% after graduation. This is a clear indication that vocational high school students regard further education as their main study aim and career planning direction.

Article 5 of the Senior High School Education Act relates to the core curriculum of skill-based senior high schools. It provides professional and practicum subjects that encompass

practical skills and cooperative education approaches, to strengthen students' professional skills and occupational abilities. From a legislative perspective, skills-based senior high schools should focus on cultivating basic technical talent in students, with the purpose of them then entering the workplace, instead of enabling students to further their education.

Higher education in Taiwan began to thrive in 1985 with the government's reintroduction of private colleges and universities. It was followed in 1989 by the Ministry of Education listing the establishment and adjustment of tertiary education institutions as the focus of education reforms. In response to the need for high-tech talent, vocational and junior colleges were re-established as science and technology universities and colleges in 1996. Fig. 1 shows the changes in the number of colleges and universities in Taiwan over the past decade. The National Taiwan Institute of Technology, founded in 1974 and renamed the National Taiwan University of Science and Technology in 1997, was the only vocational university in Taiwan at the time. The second was the National Yunlin University of Science and Technology, founded in 1991. By 2017, the implementation of the Ministry of Education's policy of increasing and reforming colleges and universities had yielded a total of 157 tertiary education institutions, 87 (55.4%) of which were vocational colleges and universities. Additionally, these institutions contained a total of 480,536 students in bachelor's degree courses.

**Figure 1.** Overview of the number and proportion of colleges and universities



With the opening of vocational colleges and universities, skills-based senior high school students regard continuing their education as the primary purpose of their studies. The present study focused on (1) whether the field that students hoped to study in after graduation was an extension of their field of speciality in the current study stage, and (2) whether the field that they were studying in at that time would affect their decision to continue their studies or seek employment directly after graduation (Jabarullah and Hussain, 2019).

## Literature Review

A review of the relevant literature in Taiwan was conducted. It revealed that past studies focused on single academic departments. Liu (2000) explored the intention of graduates from the Department of Tourism, junior colleges and above, to further their education or seek employment. It was found that their parents, teachers, and peers had a significant influence on their decision to further their studies. Additionally, students of the five-year junior college program had a higher willingness than those from other systems to further their education. Further, only a small proportion of these students were willing to continue in the tourism industry (catering and hospitality) when they sought employment. Lee et al. (2004) studied the intentions of students of a two-year technical program to further their education or seek employment. The results showed that 21.4% of the students chose to further their studies. Their main reason was to achieve higher academic qualifications to meet the needs of their future workplace. The remaining 78.3% of the students preferred to directly seek employment upon graduation to improve the financial status of their families.

Lee et al. (2004) also discovered that students' decisions to further their studies or directly seek employment after graduation significantly correlated with their sex, field of study, and whether they had part-time jobs. Huang (2010) conducted a preliminary study on the development and dilemmas of senior high school students of the sport talent classes in Yunlin County, Taiwan. They found that 85% of the students were willing to further their studies (65% of whom entered sports-related departments, and 20% of them entered other departments), whereas the other 15% did not pursue higher education. The reason for the high percentage of students furthering their studies was the perception that they would be otherwise at a disadvantage due to a lack of a special expertise in employment. Hsieh et al. (2011) explored university students' sex and college majors. It was discovered that the factors influencing female students from the vocational school system in choosing male-dominated departments (science and engineering) were having parents with a high education level, disregarding the opinions of significant others (teachers and parents), and disregarding their own interests and job opportunities. Additionally, the study revealed that 77% of the female students who went against gender norms in their studies had already studied in male-dominated departments during vocational high school. Hung (2011) investigated the career choices of high school athletic class students and found that 91.6% wished to further their studies; 59% of them targeted universities and 32.6% of them aimed for a master's degree. Additionally, 61.7% of the students hoped that their future employment would be sports related, and 38.3% of did not want their future jobs to be related to sports. Fu (2012) explored the personal factors that influenced the intention of early childcare students of vocational high schools to further their studies or seek employment upon graduation. Their results showed that 94.5% of the students wished to further their studies, 31% of whom applied to departments unrelated to early childcare. Factors influencing students opting to pursue higher

education included parents' expectations and internship experience, whereas those who directly sought employment upon graduation were influenced by internship experience that was unrelated to early childcare. Liu (2017) analysed the decisions and channels involved in graduates from the nursing department of junior colleges and discovered that 67.75% of the graduates worked at hospitals or clinics after graduation, whereas 26.71% continued their education in nursing-related departments.

Based on the aforementioned literature review, the postgraduation career planning of students in vocational high schools or junior colleges demonstrates an increase in the decision to engage in further study. Additionally, the field of higher education or employment was generally based on an original speciality. The exception was early childcare students, who exhibited a higher proportion of involvement in cross-disciplinary studies and careers.

### **Research Data**

The data source of this study were census survey data taken from second-year students in senior high schools and two-year junior college programs of the 2015 academic year from the Taiwan Upper Secondary Database. Using the discipline cluster of students in "Field of Speciality," the correlation between "the most desirable field after graduation," "post-graduation development," and the field of speciality that the students in each discipline cluster were studying at the time, was analysed.

### ***Variable Name***

Response variable: field of speciality, which is a categorical variable.

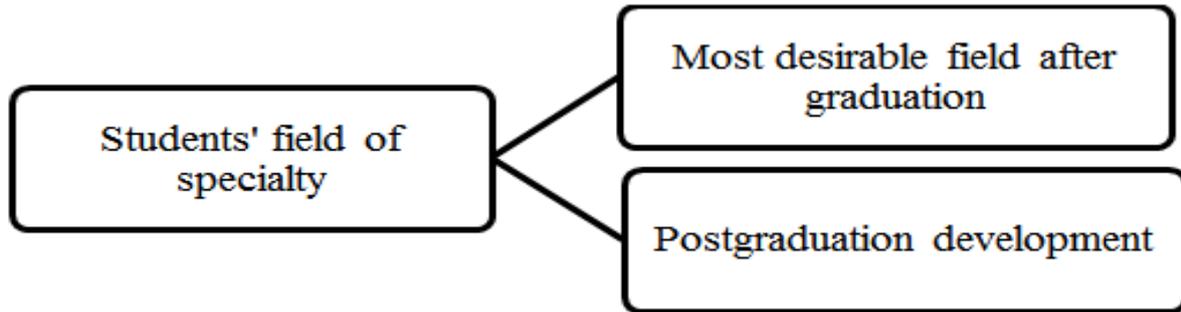
Explanatory variable: the most desirable field after graduation and postgraduate development (both are categorical variables).

### ***Research Method***

Both the response variable and explanatory variable are categorical variables; thus, the chi-square test was used for analysis.

### **Research Framework**

**Figure 2.** Research framework of the correlation between skills-based senior high school students' field of speciality and postgraduation development.



### **Research Purpose**

The purpose of this study was to determine whether students of skills-based senior high school would choose to work in their current field of speciality after graduation, and to understand the influence of their field of speciality on their decision to continue their studies or seek employment after graduation.

### **Data Analysis and Statistical Methods**

A total of 21,736 raw data samples were extracted from the survey of year two students in senior high schools and two-year junior college programs in the 2015 academic year, from the Taiwan Upper Secondary Database. After invalid samples (incomplete answers and non-research-target groups, the latter of which refers to individuals born after 1999) were excluded, and the observed values of the variables were sorted, 3,879 valid samples were obtained. Subsequently, a chi-square test was conducted on the students' fields of speciality when they continued their studies (enrolled in universities) or sought employment and their fields of speciality when they were studying in skills-based senior high schools.

### **Frequency Distribution Tables of Students' Demographic Data**

**Table 1:** Frequency distribution table of students' sexes

	Frequency	Percentage
Men	1,790	46.1
Women	2,089	53.9
Total	3,879	100.0

**Table 2:** Frequency distribution table of students' fields of speciality

	Frequency	Percentage
Arts and humanities	547	14.1
Social science, business, law, and services	794	20.5
Science, engineering, manufacturing, and construction	1,068	27.5
Agriculture, medicine, and social welfare	423	10.9
Life skills, others	1,047	27.0
Total	3,879	100.0

***Correlation between Students' Decision to Further Their Studies or Directly Seek Employment in the Future and the Fields of Speciality they were Studying***

In the raw data, the discipline clusters of the year-two students in senior high schools and those in two-year junior college programs were divided into 27 observed values: education (college); arts and humanities (college); social science, business, and law (college); science (college); engineering, manufacturing, and construction (college); agriculture and veterinary medicine (college); medicine and social welfare (college); services (college); other (college); academic cluster; machinery cluster; motorised machinery cluster; electrical and electronic engineering clusters; chemical engineering cluster; civil engineering and architecture clusters; business management cluster; foreign languages cluster; design cluster; agriculture cluster; food cluster; home economics cluster; hospitality cluster; aquatic products cluster; maritime affairs cluster; art cluster; cosmetology cluster; and comprehensive cluster. The aforementioned values were further sorted into five observed values, namely arts and humanities; social science, business, law, and services; science, engineering, manufacturing, and construction; agriculture, medicine, and social welfare; and others, with "others" including the discipline cluster of life skills (home economics, hospitality, and cosmetology).

$H_0: \rho = 0$ , The fields that students studied at university or work in the future are not correlated with the field of speciality they were studying at the time.

$H_a: \rho \neq 0$ , The fields that students studied at university or work in the future is correlated with the field of speciality they were studying at the time.

**Table 3:** Contingency table of “fields of speciality” and “most desirable field after graduation”

	Most desirable field after graduation					Total
	Arts and humanities	Social science, business, law, and services	Science, engineering, manufacturing, and construction	Agriculture, medicine, and social welfare	Others	
Arts and humanities	<b>306</b>	147	26	21	47	547
Social science, business, law, and services	125	<b>496</b>	65	34	74	794
Science, engineering, manufacturing, and construction	64	175	<b>685</b>	43	101	1068
Agriculture, medicine, and social welfare	13	66	10	<b>316</b>	18	423
Others	99	<b>783</b>	37	40	88	1047
Total	607	1667	823	454	328	3879

In Table 3, the distribution of numbers in bold, red font indicates that most students tended to stay in their original fields of speciality after graduation, regardless of whether they continued their studies or sought employment. Only most students in the “others” field intended to switch to the “social science, business, law, and services” field, indicating that the two variables of “fields of speciality” and “most desirable fields after graduation” were correlated.

**Table 4:** Chi-square test of “fields of speciality” and “most desirable field after graduation”

	Values	Degree of freedom	Asymptotic significance (two-tailed)
Pearson’s chi-square	<b>4205.627</b>	16	<b>.000</b>
Likelihood ratio	3170.748	16	.000
Cramer’s V	<b>0.521</b>		<b>.000</b>

As shown in Table 4, the Pearson' chi-square value for "fields of speciality" and "most desired field after graduation" was 4205.627, and the two-tailed significance value was less than 0.05. Significance was achieved, thus rejecting  $H_0$ . The fields that students studied at universities or work in, in the future, were thus correlated with the fields of speciality that they were studying at the time. Additionally, Cramer's V was 0.521, which is the correlation coefficient between the two variables, indicating a moderate correlation between them.

***Correlation between Students' Decision to Continue Their Studies or Seek Employment upon Graduation and the Fields of Speciality they were Studying at the Time***

In the raw data, the highest level of education that students expect to complete was divided into six observed values: general and vocational high school; junior college; general university; science and technology university or technical college; master's degree; and Ph.D. "General and vocational high school" and "junior college" were classified as "direct employment after graduation," whereas "general university," "science and technology university or technical college," "master's degree," and "Ph.D." were classified as "further studies after graduation," yielding a total of two observed values.

$H_0: \rho = 0$ , the fields that students study at university or work in in the future is not correlated to the field of speciality that they were studying at the time.

$H_a: \rho \neq 0$ , the fields that students study at university or work in in the future is correlated to the field of speciality that they were studying at the time.

**Table 5:** Contingency table of fields of speciality and postgraduation development

		Postgraduation development		
		Directly seek employment	Further education	Total
Fields of speciality	Arts and humanities	81(0.15)	466(0.85)	547
	Social science, business, law, and services	167(0.21)	627(0.79)	794
	Science, engineering, manufacturing, and construction	301(0.28)	767(0.72)	1068
	Agriculture, medicine, and social welfare	134(0.32)	289(0.68)	423
	Others	377(0.36)	670(0.64)	1047
	Total	1060	2819	3879

In Table 5, the number in parentheses in each column represents its proportion in the same column. The distribution of proportions showed that regardless of the fields of speciality, the

proportion of students who directly sought employment after graduation was lower than the proportion who furthered their studies. However, a higher proportion of students (close to 0.4) in the “others” fields directly sought employment after graduation. Therefore, fields of speciality and postgraduation development have a low correlation.

**Table 6:** Chi-square test of “field of speciality” and “postgraduation development”

	Values	Degree of freedom	Asymptotic significance (two-tailed)
Pearson’s chi-square	<b>103.163</b>	4	<b>.000</b>
Likelihood ratio	107.436	4	.000
Cramer’s V	<b>0.163</b>		<b>.000</b>

Table 6 shows that the Pearson’s chi-square value for fields of speciality and postgraduation development was 103.163 and the asymptotic significance is less than 0.05; the significance level was achieved, thus rejecting  $H_0$ . Thus, students’ decisions to further their studies or directly seek employment after graduation was correlated with the fields of speciality they were studying at the time. Moreover, Cramer’s V was 0.163, indicating that the two variables had a low correlation.

## Conclusion

This study used the census survey data of second-year students in senior high schools and those in two-year junior college programs of the 2015 academic year from the Taiwan Upper Secondary Database. It explored the correlations of skills-based senior high school students’ fields of speciality, with their most desired field after graduation and their decision to further their studies or directly seek employment.

A chi-square test on the 3,879 data samples showed that most students tended to remain in their original fields of speciality after graduation. Only students in the other discipline clusters (including the life skills cluster that encompasses home economics, hospitality, and cosmetology) wished to transfer to the fields of social science, business, law, and services. The Pearson’s chi-square value fields of speciality and most desirable field after graduation was 4205.627 and the two-tailed p value was less than 0.05. Thus, statistical significance was reached. Additionally, Cramer’s V was 0.521. Thus, the fields of speciality that students studied at university or work in, in the future, were correlated with the fields of speciality they were studying at the time.

In terms of the correlation between students’ decision to further their studies or directly seek employment after graduation and the fields of speciality that were studying at the time, a higher proportion of students in all fields opted to further their studies after graduation.



However, the proportion of students in other fields who opted to directly seek employment after graduation was close to 0.4. Therefore, fields of speciality had a low correlation with postgraduation development. The Pearson's chi-square value for fields of speciality and postgraduation development was 103.163 and the two-tailed p value was less than 0.05, achieving the significance level. Therefore, students' decisions to further their education or directly seek employment after graduation was correlated with the fields of speciality they were studying at the time. Additionally, Cramer's V was 0.163, indicating a low correlation between the two variables.

Education after junior high school in Taiwan is separated into general senior high schools and skills-based senior high schools, the latter of which encompasses five categories, 15 groups, and 82 departments. For adolescents still exploring their future careers, the aforementioned circumstances may result in a premature choice of education. The most obvious case is the student in the discipline cluster of home economics who sought to transfer to the services cluster after graduation. Possible reasons for this include factors such as premature classification in education and a low birth-rate, both of which require further exploration in future studies.



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