SENIOR RESEARCH

Topic: Education-job mismatch among differently motivated individuals:

A case study of senior undergraduate students.

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Abstract

Several researches examine about the impact of education mismatch. Since there is a huge percentage of education-mismatch in Thailand, this research inquires about why education-mismatch occurs and aims to take psychology reasons into account. According to Self-determined theory, motivation is the main factor that demonstrates behavior (Deci & Ryan, 1991). The purpose of this paper is to find the impact of education-job mismatch and different motivation on education. Basically it indicates whether educations that are driven by different form of motivations influent education-job-mismatch diversely. Results suggests that students with self-determined form of motivation on higher education have higher probability of education-match while students with amotivated form of motivation have lower probability.

Key words: Education-job mismatch; Self-determined theory; Intrinsic motivation; Integrated motivation; Identified motivation; External motivation; Introjected motivation; Amotivation.

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Section 1: Introduction

1.1 Introduction

Human capital is one of the main factors that enhances economic performance. Without it, there would be no technology, innovation, research, and development. According to human capital theory, education is one of the key factors beside training and experience that advances human capital. People are willing to invest in education in order to improve their skills and abilities. However, according to Thai labor force survey, there were 36% vertical mismatch and 40% horizontal mismatch in Thai labor market. This is an obstacle to develop human capital. Instead of using the expertise and skill that workers learn in the universities, they need to be retrained as they get into the jobs that mismatch to their fields of study. Further, there are opportunity costs in investing the degree such as tuition fees and time. They should have invested in something else that benefit themself in terms of ability and knowledge. In addition, Thai society is common to frame children, and parents do not really let them on their own. Decision in higher education for adolescents is influenced by many factors such as social pressure, social recognition, and external factors rather than only students themselves. However, when they are mature and confident enough to determine their lives, the job selection might not match with the education that they decided before.

This research aims to investigate the cause of horizontal education mismatch in Thailand. The main question is to find whether different form of motivations on higher education influence horizontal education mismatch. The result of this study shows the effect whether those motivations influence education mismatch. It will have implication for government to develop education curriculums and run a campaign to calm down the pressure to adolescents and encourage company trainee to

make students engage more in job characteristics. When human capital is advanced by the right education, it will help develop Thai economy.

1.2 Background

Students' decisions in higher education are affected by different factors. However, this research is based on self-determination theory because motivation is the central concern that drives people from one place to another. According to Deci and Ryan (1985, 1991), Self-determination theory classifies motivations into three main types that derive human behavior. The diagram below will help you understand about the theory.

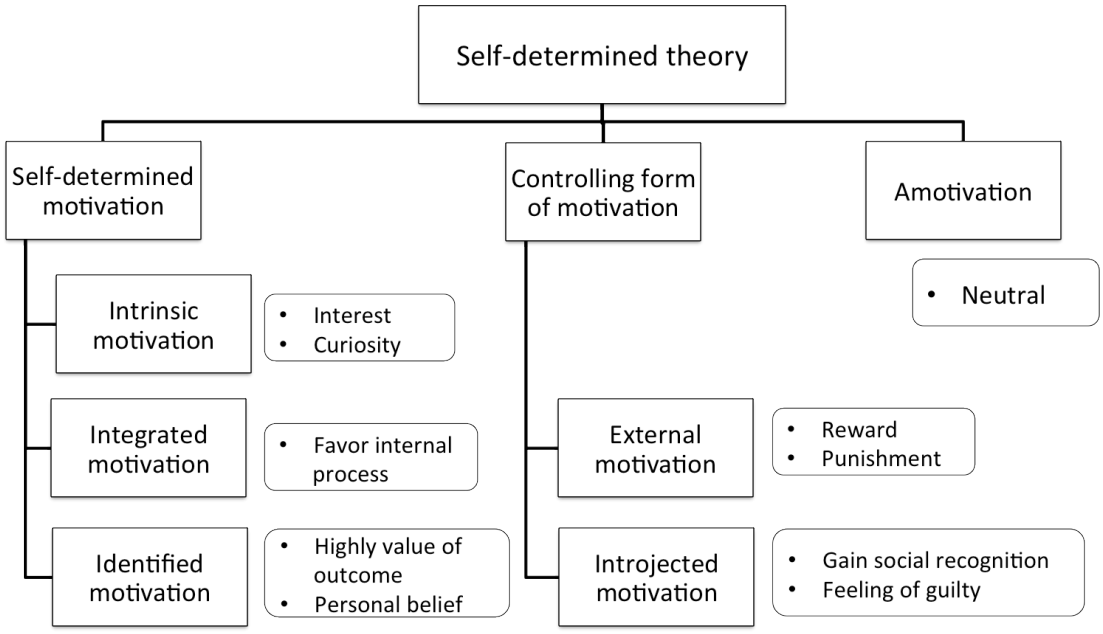

Figure 1 The diagram of sub motivations in self-determined theory

Self-determined theory is composed of three main types, which are self-determined, control, and amotive form of motivation. Self-determined form of motivation is the motivation that occurs when people want to do activities because of the activities themselves. In contrast, control form of motivation represents the motivations that do not incur from the activities, but it influence by other extrinsic factors. Lastly,

amotive behavior is when people feel indifferent of doing activities. It can be the category that one does not fit in either self-determined or control form of motivation (Deci & Ryan, 1991).

Attribute to Deci and Ryan (1985, 1991), self-determined form of motivation is consisted of three different types of motivation, which are intrinsic, integrated, identified motivation. Intrinsic motivation is when people behave because they just happen to like it. It can be in the form of interest, curiosity, preference, and challenge (Deci & Ryan, 1991). For example, I want to get a degree in Economic because I am interested in it. Furthermore, Deci & Ryan (1991) stated that integrated motivation refers to behavior that results from favor of internal process. For example, I want to study Economic because I think that the knowledge of Economic will benefit me in the future. Lastly, identified motivation represents behavior that is driven by the value of outcome and the belief that will bring good to one's life (Deci & Ryan, 1985). For example, I believe that if I study Economics, it will be easy for me to find a job.

According to Deci & Ryan (1985), two types of control form of motivations are external motivation and introjected motivation. External motivated behavior results from external factors such as reward and punishment (Deci & Ryan, 1985). For example, I always do exam preparation two months ahead, because I want a good grade. In this case, grading is a reward for students. With introjected motivation, the behavior is to gain social recognition and to get out of the feeling of guilty (Deci & Ryan, 1991). For example, I attend college because all my friends are going one.

1.3 Objective and Scope of the study

The objective of the study is to identify the reasons of education mismatch in the context of motivation. It analyzes the relationship between education-job mismatch and motivation on higher education whether decisions that make from different forms of motivation cause significantly effect on education mismatch. The main forms of motivation are self-determined, control, and amotive. It only deals with horizon mismatch on the sample of Bachelor degree senior students.

As a result, hypothesis is whether self-determined on higher education causes senior students to work on their field of expertise. It is to examine the effect of self-determined form of motivation on higher education and education mismatch. In contrast, anther hypothesis to observe the impact of control form of education and education mismatch is whether control form of motivation on higher education cause senior students work in their field of expertise. Lastly, amotive motivation is also investigated by the following hypothesis: amotive decision in higher education increases the chance of education-job mismatch.

Section 2: Literature review

Numbers of studies about self-determination theory and study progress found positive relationship between intrinsic motivation and study development, and vice versa for extrinsic motivation. For example, Ntoumanis (2001) stated that students who participated in Physical Education class because of intrinsic motivation improved themselves toward the certain skills because they found it is fun and interesting. He also indicated that students who were extrinsically motivated tended to feel bored and find learning as a waste of the time. Likewise, Areepattamannil et al (2001) showed that Indian immigrant in Canada who were intrinsically motivated got more academic

achievement than Indian adolescents in India who were extrinsically motivated. Burnam et al (2014) stated that students who were more self-determine motivated reported lower procrastinate problematic in term of paper writing, exam preparation, and reading assignment. They tended to achieve higher GPA. However, some studies said that intrinsic motivation and self-determined motivation are not the only way to achieve study improvement. Covington (2001) implied that beside autonomy, independence, and completion other unknown avenues from different cultures can motivate and effect similarly. Fazey (2001) denoted that young students who are externally motivated got a score higher than internal motivated ones. In addition, Lin et al (2001) examined that students with both intrinsic and extrinsic motivation together also achieved in studying. Students who were motivated by a medium level of extrinsic motivation and high level of intrinsic motivation got higher mean scores than students with low or high extrinsic motivation. They also found that high and medium intrinsic motivated students acquired low anxiety test and high self-efficacy. They concluded that high and medium intrinsic motivated students had higher organization and planning skill during the exam.

Plenty of researches found that several reasons determined education mismatch. McGuinness and Sloane (2011) indicated that income was not the only reason causing education mismatch but also job satisfaction. Robst (2007) affirmed that men and women responded that change in interest, opportunity, and working condition also played a role in being mismatch. Likewise, innovation and technology play an important a role in improving education-job match because it helps facilitate job channels (Ghignoni and Verashchagina, 2014). According to Bender and Heywood, J. S. (2009), workers with Ph.D in science are more likely to be education-job mismatch when they gain more experiences at the decreasing rate. He said that

mostly the mismatches occurred when they were more focusing on specific task rather than leading the research.

According to the literatures above, self-determined form of motivation, intrinsic motivation, and extrinsic motivation cause different impacts to education achievement. Since education is a base for career path, it will benefit workers in the long run. However, education-job mismatch can arise from several reasons such as job satisfaction, innovation, technology, experiences, change in interest, opportunity, and working condition. This research predicted that decision in higher education could significantly influence education mismatch. It aims to put together the cause of education mismatch and self-determination theory. The research specifically examined whether self-determined and control form of motivations on higher education cause education mismatch.

Section 3: Research methodology

3.1 Conceptual framework

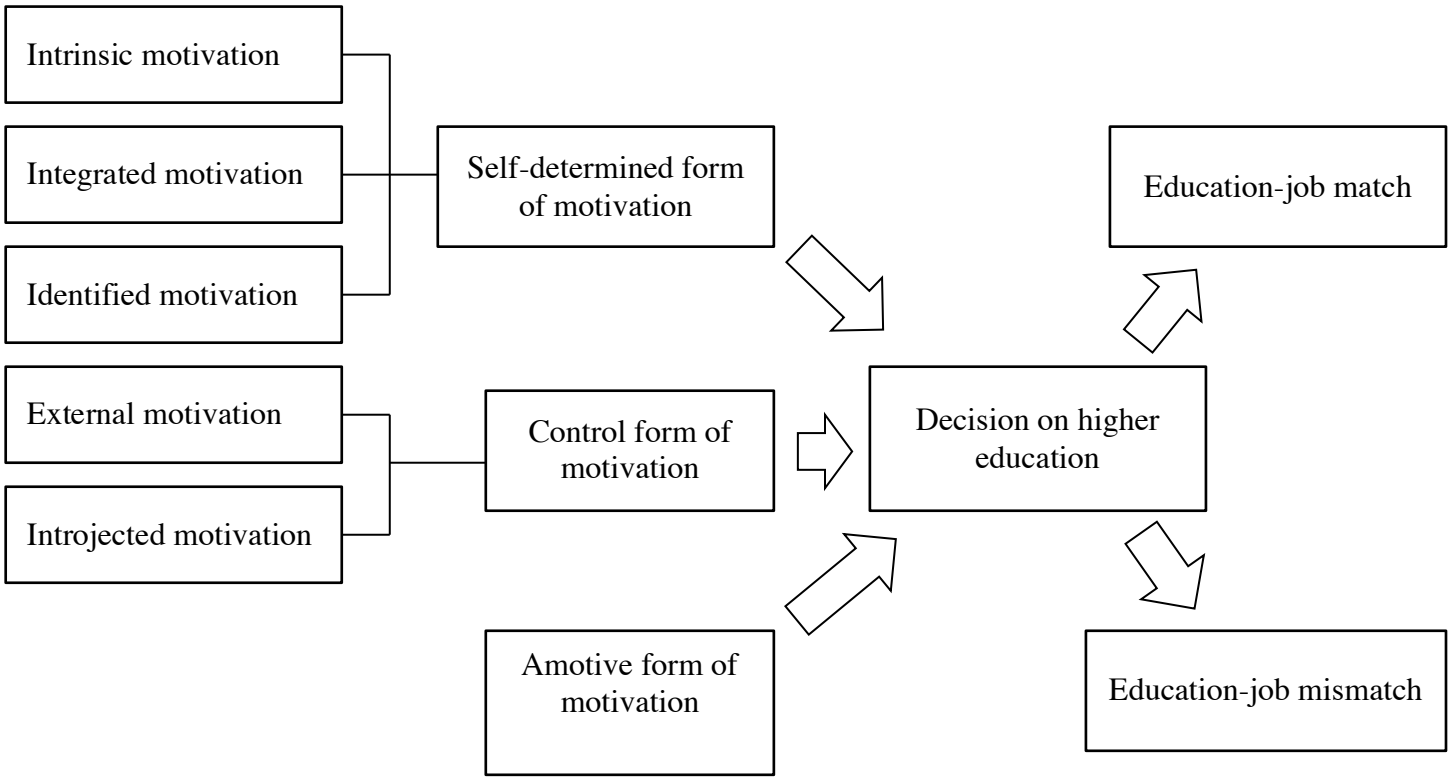

Figure 2 Conceptual Framework

According to the figure 2, first respondents were examined whether self-determined, control, amotive, and both self-determined and control form of motivations derived their decision on higher education. By doing that, Intrinsic, Integrated, Identified, External, and Introjected motivations were observed which kind of motivations are outstanding. For example, if one's behavior is caused by external and introjected motivation rather than other motivations, one will belong to control form of motivation. After respondents were categorized into self-determined, control, and amotive form of motivations, education-job mismatch was spotted whether it affected by different kinds of motivations in the model that will be discussed in the Empirical Model section.

3.2 Data Collection

This study aims to survey on 494 populations of Thai senior students in Bangkok. Participants were snowball sample via social media and also random pencil and paper sample. The respondents are 352 female and 144 male with age of 21-24. 399 participants study in the top rank universities in Thailand such as Chulalongkorn, Thammasard, Kasedsard, and Mahidol. There are 40.7% that their jobs match with their education and 59.3% that their jobs do not match with their educations. Furthermore, percentages of students that are self-determined, control, and amotived form of motivation are 53.85%, 15.59%, and 30.57% respectively. There are 45.85% of students who are driven by both self-determined and control form of motivations[1].

Ntoumanis (2001) and Chen et al (2005) survey was adapted to suit this study because it measured students' motivation on Physical education and English respectively. Senior students were asked "I take part in the major that I currently study …", and they needed to answer in Likert scale, which ranked from *Strongly disagree* (1) to *Strongly agree* (5)[2]. The reasons of attending college were collected to categorize respondents' motivations into sub motivation and formed into broad forms of motivation: self-determined, control, and amotivation. The examples of the reasons are curiosity, interest, value of outcome, value of process, challenge, preference, opportunity, parents' business, parents' education, friends' education, feeling of guilty, failure-oriented, reward, expected wage, grading of the subject in class, admission scores, and university reputation. The questions are for example "because I always curious about it", "because I am interested in it", "because I have family business" and "because my parents want me to study". There were four questions

[1] More descriptive statistic is found in Appendix 1
[2] Full Questionnaire in both Thai and English can be found in Appendix 3

each to examine intrinsic, integrated, identified, external, and introjected motivation and two questions about amotived. Also, the general data such as gender, age, and major were collected. Family business was asked as a control variable.

3.3 Determining education-job match and mismatch

To determined education-job mismatch, number of studies asked the respondents straightly how their job related to their education, which Farooq (2011) claimed that it was a Self-assessment method. For example, attribute to Boudarbat and Chernoff (2010), respondents were asked, "How closely is the (main) job you held last week related to your certificate, diploma or degree?", and three choices of answers were "closely related", "somewhat related", and "not related". Likewise, Robst (2007) questioned respondents "thinking about the relationship between your work and your education, to what extent was your work on your principal job held during the week of April 15 related to your highest degree field?". They needed to reply whether it was closely related, somewhat related, and not related. The workers who answered 'somewhat related' or 'not related' were considered education mismatch, and workers whose answered 'closely related' were categorized as education match.

As a result, self-assessment method was used in this research to separate senior students into two groups of education-job match and education-job mismatch. As different degrees pursue different types of study including majors and minors, a lot of educations under the same name contain distinct curriculums and subjects. Furthermore, varieties of works around the world have their specific detail of jobs. Thus, senior students who study the degree and seek for the job themselves know the best what they learned and what clarification of their jobs. Boudarbat & Chernoff

(2010) and Robst (2007) studies were adapted to this survey to group education match and mismatch. Respondents were asked, "how much do you think your job or your master degree relate to your bachelor degree?" They needed to answer 'closely related', 'somewhat related', and 'not related'. And the method to separate students into groups of education match and mismatch followed Robst (2007) procedure.

3.4 Data Analyzing

Firstly, the respondents' motivations were grouped into intrinsic, integrated, identified, external, and introjected motivation. Reliability of each motivation question was tested. Attribute to Ntoumanis (2001) and Burnam et al (2014), Cronbach's alphas was used to calculate reliability of Likert scale. According to Nunnally (1978), Cronbach's alphas is used to test the reliability of elements that analyze from likert scale. It values from 0 to 1 and the higher the value, the more reliability the result. Normally, the accepted level is 0.7 (Nunnslly, 1978). For example, there are four questions about intrinsic motivation in the survey. Cronbach's alphas help determine whether these four questions are strong enough to imply intrinsic motivation. If cornbach's alphas of the four questions are equal or more than 0.7 meaning that they are reliable to imply intrinsic motivation. However, this research considered Cronbach's alphas at 6.0 to 7.0 is acceptable. Cornbach's alphas of intrinsic, integrated, identified, external, and introjected motivations are 0.715, 0.621, 0.798, 0.640, and 0.749 respectively. However, Cornbach's alphas of amotive is 0.531 which is less than 0.6 as a result there is no question about amotive used to imply amotivation. Instead, if ones do not belong in any self-determined and control form of motivation, they will be considered as amotive (Deci & Ryan, 1991).

Secondly, the score of intrinsic, integrated, identified, external, and introjected motivation were calculated. It is because the survey contained reasons of

attending higher education for each kind of motivations. For example, there are five questions containing external motivated reason for higher education. The sum of all the questions scored from *Strongly disagree* (1) to *Strongly agree* (5) will be classified as participants' score of external motivation. As a consequence, intrinsic, integrated, identified, external, and introjected motive scores were computed. To determine whether participants made decision according to what kinds of motivation, the sample mean was adopted as a classification standard. If respondents' motivations score is higher than the mean score, they will be accounted as 1 in those motivations and 0 if smaller. When respondents got 1 in the motivation, it means that they are driven by those kinds of motivation if not is 0 as a dummy variable. One can have more than one motivation. However, I believe that different kinds of people are unlikely to have the same idea especially people with different gender, interests, and levels of intelligent. Thus, ANOVA were used to test the difference mean score of each group in terms of gender, faculties, and GPA. The paper found that there is no different in motivation mean scores among the rank of GPA; in contrast, they has significant distinctive amount among gender and faculties at the significant level of 5%. The figure on the next page will help understand how mean standards were calculated.

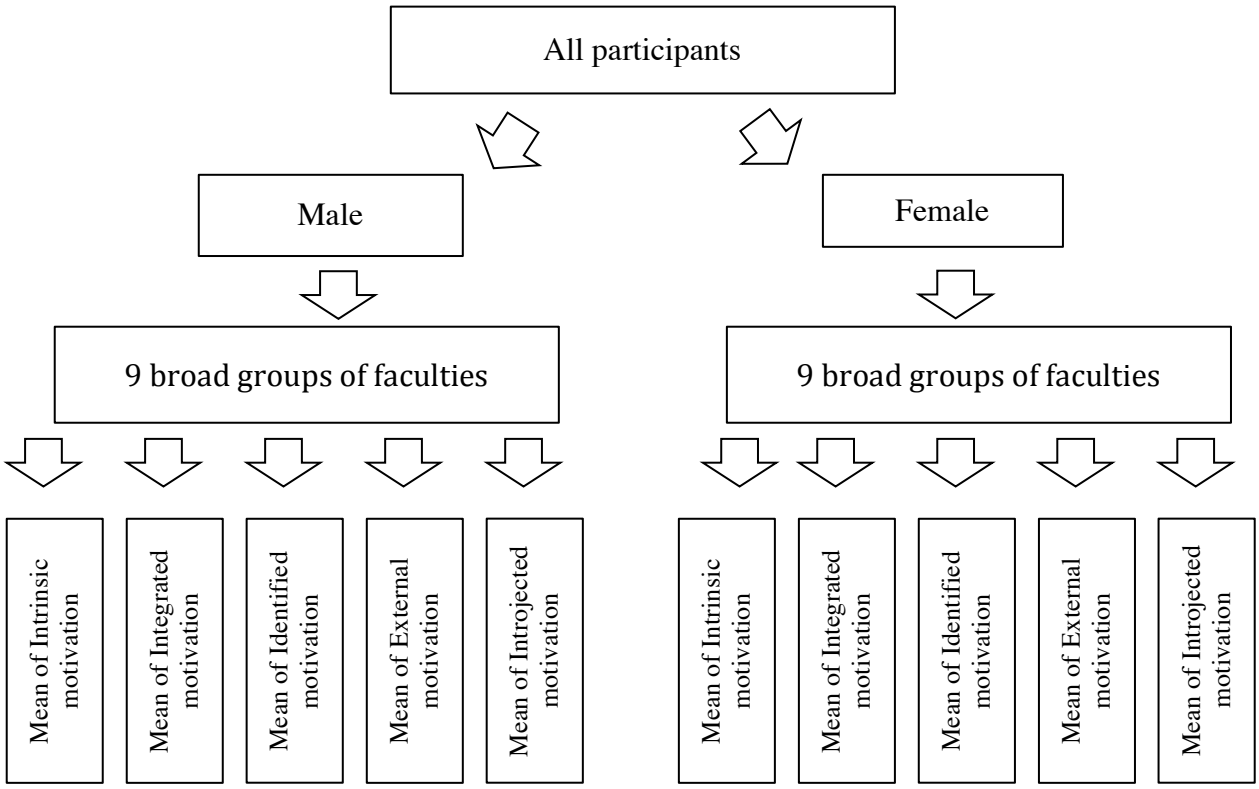

Figure 3 Different mean scores of motivations among gender and faculties.

According to figure 3, all participants were grouped into male and female after that they were separated into 9 broad groups of faculties. Then, each group of faculties had their own mean score of intrinsic, integrated, identified, external, and introjected motivations. Thus, there were 18 mean standards for each motivation differently from faculties and gender. Overall there were 90 mean standards.

Lastly, after all sub motivations were identified, the scores were summed up to self-determined and control form of motivation. For example, one gets 1 for intrinsic, identified, and external motivation and 0 for integrated and introjected motivation. His self-determine score is 2 because intrinsic, integrated, and identified motivations belong to self-determined form of motivation[3]. His control form of motivation is 1

[3] Self-determined score = Intrinsic motivation socore + Integrated motivation score + Identified motivation score = 1+1+0 = 2

since external and introjected motivations belong to control form of motivation[4]. The mean scores of self-determined and control form of motivations were computed and accounted as standard to classify whether respondents' decision on higher education were based on either self-determine and/or control form of motivations. They were grouped as dummy variable where they counted as 1 when they were more than mean standard and 0 if otherwise. Moreover, if ones do not belong to either form of motivation, they will be sorted as amotive form of motivation.

3.5 Empirical Models

To examine impact of education-job mismatch and motivations on higher education, Dprobit model helped exploit the effect. It is simply to determine the probability of education mismatch given the control variables and motivations. Since correlation of self-determined and control form of motivations is 0.1001 which considers as a low correlation. They could examine in the same model. In contrast, self-determined and control form of motivation had high negative correlation with amotived form of motivation at the level of -0.7178 and -0.5305 respectively, they needed to examine in separate model. Thus, hypothesis about an influence of self-determined and control motivated decision on higher education and education-job mismatch could be described in one model (1), whereas amotive form of motivation needed to be in separate model (2). Both models are on the next page.

[4] Control form of motivation score = External motivation score + Introjected motivation = 1+0 =1

Pr (Jobmatch = 1|X) = f(Self-determined form of motivation, Control form of motivation, Female, Age, Top Universities, Other public universities, Other private universities, GPAX, Social science, Business administration, Engineering, Art and humanity, Law, ICTT, Other faculties, Family business) (1)

Pr(Jobmatch = 1|X) = f(Amotivation, Female, Age, Top Universities, Other public universities, Other private universities, GPAX, Social science, Business administration, Engineering, Art and hummanity, Law, ICTT, Other faculties, Family business) (2)

- Where *Pr (Jobmatch = 1|X)* is probability of job-education match given independent variables on the right side. On the right side is the function of all control variables and motivation variable.
- Respondents whose score higher than self-determined mean standard are count as 1 in *Self-determined form of motivation*; 0 otherwise.
- *Control form of motivation* equals to 1 if the score pass the mean standard; 0 otherwise.
- *Amotivation* equals to 1 if *Self-determined form of motivation* and *Control form of motivation are 0*; 0 otherwise.
- Female is a dummy variable where 1 is female and 0 is male.
- Ages count from 20-24.
- *Top Universities*, which are Chulalongkorn University, Thammasard University, Kasedsard University and Mahidol University equals to 1 otherwise 0.

- If it is other universities rather than the *Top Universities*, it equals to 1 either in *Other public universities* or *Other private universities*; 0 otherwise.
- GPAX ranks as below:
    - Lower than 1 = 0
    - 1.01-1.50 = 1
    - 1.51-2.00 = 2
    - 2.01-2.50 = 3
    - 2.51-3.00 = 4
    - 3.01-3.50 = 5
    - 3.51-4.00 = 6
- If the faculties belong to any kind of broad categories of *Social science, Business administration, Engineering, Art and humanity, Law, and ICTT*, it equals to 1 in those categories and 0 if otherwise. If the faculties do not belong to any categories, it will be count as 1 in *Other faculties*; 0 otherwise.
- *Family business* is 1 for respondents whose have family business, if not it equals to 0.

I further investigated whether people with family business whose decisions on higher education were based on either self-determined and/or control form of motivation have any influents to education mismatch (3). Also, people who have family business choose a degree amotively (4). The models are on the next page.

Pr (Jobmatch = 1|X) = f(FambusxSelfdetermined, FambusxControl, Female, Age, Top Universities, Other public universities, Other private universities, GPAX, Social science, Business administration, Engineering, Art and humanity, Law, ICTT, Other faculties, Family business) (3)

Pr (Jobmatch = 1|X) = f(FambusxAmotivation, Female, Age, Top Universities, Other public universities, Other private universities, GPAX, Social science, Business administration, Engineering, Art and humanity, Law, ICTT, Natural Science, Other faculties, Family business) (4)

To construct these models, *Family business* multiplied by *Self-determined form of motivation* was created to examine the result, and so as *Control form of motivation Amotivation*. They were named as *FambusxSelfdetermined*, *FambusxControl*, and *FambusxAmotivation*.

Section 4: Discussion and Conclusion

4.1Result

Table 1. Dprobit result of probability of education-job mismatch where education-job mismatch =0; match = 1.

Variables	Dprobit Model (1)	Dprobit Model (2)	Dprobit Model (3)	Dprobit Model (4)
Self-determined	0.12678**			
	(0.0456)			
Control	0.0140			
	(0.0472)			
Amotivation		-0.1423**		
		(0.0477)		

Variables	Dprobit Model (1)	Dprobit Model (2)	Dprobit Model (3)	Dprobit Model (4)
FambusxSelfdetermined			0.1007	
			(0.0652)	
FambusxControl			0.0197	
			(0.0662)	
FambusxAmotivation				-0.1175**
				(0.0632)
Female	0.0265	0.0265	0.0258	0 .0267
	(0.0544)	(0.0543)	(0.0541)	(0.0541)
Business administration	0.2491**	0.2445**	0.2447**	0.2432**
	(00784)	(0.0785)	(0.0783)	(0.0783)
Engineering	0.3544**	0.3549**	0.3505**	0.35021**
	(0.0698)	(0.0697)	(0.0698)	(0.0698)
ICT	0.2583**	0.2568**	0.2543**	0.2569**
	(0.1079)	(0.1085)	(0.1084)	(0.1078)
Natural Science	0.2648**	0.2613**	0.2586**	0. 2552**
	(0.0908)	(0.0911)	(0.0905)	(0.0906)
GPAX	0.0871**	0.0919**	0.0898**	0.0923**
	(0.0262)	(0.0261)	(0.0260)	(0.0260)
Family Business	-0.0515	-0.0496	-0.118	-0.0187
	(0.0468)	(0.04679)	(0.0609)	(0.0514)
Number of observations	494	494	494	494
Prob > chi2	0.0000	0.0000	0.0001	0.0000
Pseudo R^2	0.0770	0.0681	0.0684	0.0692

(**) represents P-value ≤ 0.05.
Social science is a base variable of all faculties.

Table1 reports several outcomes that cause of education-mismatch. According to Dprobit model (1), the results suggest that there is a significant relationship between education-mismatch and self-determined form of education. If students select their majors according to their self-determined form of motivation, it is likely that the education-jobs match probability will approximately increase by 13%. However, if

their degrees are driven by control form of motivation, there is no significant result. It means that they can either match or mismatched with their study. In contrast, Dprobit model (2) shows that impact of amotivation form of motivation on higher education and education-mismatch is an opposite of self-determined form of motivation in Dprobit model (1). Students who are amotivated on their degree raise the probability of education-job mismatch approximately by 14%. Furthermore, Dprobit model (3) and (4) also display students who have family business and drive their degree by self-determined, control, or amotivated form of motivation. Result in Dprobit model (3) demonstrates that students with family business whose degrees were pushed by either self-determined and/or control form of motivation do not have any significant impact on probability of education-job mismatch. On the other hand, Dprobit model (4) indicates that students who have family business and drive their degree upon amotivated form of motivation induce the probability of education-job mismatch nearly by 11.8%.

Deprobit model (1), (2), (3), and (4) suggest approximately the same result of gender, faculties, GPAX, and family business. Furthermore, there is no significant difference among gender on education-job mismatch. Students who attend Business administration, ICT, or Natural science degree have higher probability of education-job match rather than social science students approximately by 26%, whereas students with Engineering degree have a higher change of 35% than social science students. However, there is no significant effect of Law, Healthcare, Art and humanities, and other degrees on education-job mismatch[5]. Likewise, Top universities and Ages do not have significant influence on education-job mismatch. In addition, students with higher GPAX decrease probability of education mismatch approximately by 10%.

[5] Full result table can be found in Appendix 2

Lastly, family business and education-job mismatch do not have any significant affect to one another.

4.2 Limitation and extension

The research aims to collect the effect of motivations on higher education and education-job mismatch. However, education-job mismatch can be resulted from different dimensions such as distance to work, wage, welfare, working hours, number of holidays, company reputation, and change in interest. Furthermore, the sample size is senior undergraduate students, which most of them have not settled with any job yet, but they have some ideas about where they want to work. However, the real life is not simple as one's thought. Their decisions can be blended and shaped into the different one by the intense of labor force. On the other hands, senior students still have a fresh memory of what drives them into the degree which it is really important to find what type of motivations in this research. Plus, this research survey was mainly from top universities in Thailand. There are students who just want to study in the top universities without considering about degrees. It would be interesting to know whether other universities result in education-job mismatch differently, since this research does not see any significant in the top universities on education-job mismatch. They might have better education-job match.

4.3 Conclusion

Probability of education-job mismatch significantly decreases when students select their degree according to self-determine form of motivation and vice versa for amotived form of motivation. With control form of motivation, there is no significant impact on probability of education-job mismatch. Furthermore, students with

amotived form of education and family business have a higher probability of getting education-job mismatch. However, there is no significant effect of education mismatch and students who have family business and drive their degree decision by either self-determined and/or control form of motivation.

Education mismatch causes a huge opportunity cost such as time and money. Instead of learning what they will benefit in the future, students just study for a degree certificate and rarely use the knowledge. We should encourage students to know what they are interested and follow their self-determined form of motivation to choose their majors. This can increase the chance of getting education-job match. Furthermore, ministry of education might find this research beneficial since it stated directly what causes student to have education-job mismatch. They can improve the curriculum by focusing more on students rather than academics. Students should be encouraged to know more about themselves in terms of interest and preference because it can help increase their self-determined form of motivation and education-job match. In addition, government can help reduce social pressure and encourage experience before study.

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Appendix 1

	Number of observations	Percentage
Number of observations	494	100%
female	350	70.9%
male	144	29.1%
		100.0%
Education-Job match	201	40.7%
Education-Job mismatch	293	59.3%
Social and behavior (ie Economics and Politics)	114	
Education-Job match	30	26.3%
Education-Job mismatch	84	73.7%
Business administaration		
(ie Accounting, Finance, and Management)	74	
Education-Job match	37	50.0%
Education-Job mismatch	37	50.0%
Engineer and construction		
(ie Engineering and Archiculture)	89	
Education-Job match	51	57.3%
Education-Job mismatch	38	42.7%
Art and humanities		
(ie Digiital art, Communication Art, and Language)	46	
Education-Job match	13	28.3%
Education-Job mismatch	33	71.7%
Law	45	
Education-Job match	16	35.6%
Education-Job mismatch	29	64.4%
ICT&IT	25	
Education-Job match	12	48.0%
Education-Job mismatch	13	52.0%
Natural Sciences (ie Math and Science)	40	
Education-Job match	19	47.5%
Education-Job mismatch	21	52.5%
Health&welfared	31	
Education-Job match	13	41.9%
Education-Job mismatch	18	58.1%
Other faculties	30	
Education-Job match	11	36.7%
Education-Job mismatch	19	63.3%

	Number of observations	Percentage
Universities		
Chulalongkorn	134	27.1%
Thamasard	74	15.0%
Kasedsart	115	23.3%
Mahidol	76	15.4%
Other public Universities	38	7.7%
Other private universities	57	11.5%
		100.0%
Facaulty according to UNESCO Institute for Statistics(2014)		
Social and behavior (ie Economics and Politics)	114	23.1%
Business administaration (ie Accounting, Finance, and Management)	74	15.0%
Engineer and construction (ie Engineering and Archiculture)	89	18.0%
Art and humanities (ie Digiital art, Communication Art, and Language)	46	9.3%
Law	45	9.1%
ICT&IT	25	5.1%
Natural Sciences (ie Math and Science)	40	8.1%
Health&welfared	31	6.3%
Other faculties	30	6.1%
		100.0%
GPAX		
Lower than 1	0	0.0%
1.01-1.50	1	0.2%
1.51-2.00	3	0.6%
2.01-2.50	70	14.2%
2.51-3.00	147	29.8%
3.01-3.50	219	44.3%
3.51-4.00	54	10.9%
		100.0%

Appendix 2

Table 2 full Dprobit result of probability of education-job mismatch where education-job mismatch =0; match = 1.

Variables	Dprobit Model (1)	Dprobit Model (2)	Dprobit Model (3)	Dprobit Model (4)
Self-determined	0.12678**			
	(0.0456)			
Control	0.0140			
	(0.0472)			
Amotivation		-0.1423**		
		(0.0477)		
FambusxSelfdetermined			0.1007	
			(0.0652)	
FambusxControl			0.0197	
			(0.0662)	
FambusxAmotivation				-0.1175**
				(0.0632)
Female	0.0265	0.0265	0.0258	0 .0267
	(0.0544)	(0.0543)	(0.0541)	(0.0541)
Age	-0.0077	-0.0017	-0.0052	-0.001
	(0.0278)	(0.0279)	(0.0277)	(0.0279)
Top Universities	-0.0923	-0.0962	-0.0937	-0.0953
	(0.082)	(0.0819)	(0.0819)	(0.0819)
Other Public Universities	-0.0451	-0.0450	-0.0534	-0.0535
	(0.1084)	(0.1084)	(0.1076)	(0.1075)
Business administration	0.2491**	0.2445**	0.2447**	0.2432**
	(00784)	(0.0785)	(0.0783)	(0.0783)
Engineering	0.3544**	0.3549**	0.3505**	0.35021**
	(0.0698)	(0.0697)	(0.0698)	(0.0698)

Variables	Dprobit Model (1)	Dprobit Model (2)	Dprobit Model (3)	Dprobit Model (4)
Art and humanity	-0.0008	-0.001	0.01	0.01
	(0.0931)	(0.0926)	(0.0932)	(0.0928)
Law	0.1039	0.1073	0.0876	0.0869
	(0.0943)	(0.0944)	(0.0934)	(0.0934)
ICT	0.2583**	0.2568**	0.2543**	0.2569**
	(0.1079)	(0.1085)	(0.1084)	(0.1078)
Natural Science	0.2648**	0.2613**	0.2586**	0. 2552**
	(0.0908)	(0.0911)	(0.0905)	(0.0906)
Healthcare&welfare	0.1466	0.1359	0.1400	0.1351
	(0.1117)	(0.1119)	(0.1115)	(0.1116)
Other Faculties	0.123	0.1224	0.1061	0.1016
	(0.1088)	(0.1088)	(0.1085)	(0.1084)
GPAX	0.0871**	0.0919**	0.0898**	0.0923**
	(0.0262)	(0.0261)	(0.0260)	(0.0260)
Family Business	-0.0515	-0.0496	-0.118	-0.0187
	(0.0468)	(0.04679)	(0.0609)	(0.0514)
Number of observations	494	494	494	494
Prob > chi2	0.0000	0.0000	0.0001	0.0000
Pseudo R^2	0.0770	0.0681	0.0684	0.0692

(**) represents P-value ≤ 0.05.
Social science is a base variable of all faculties.

Appendix 3

Questionnaire

1. Sex ☐ male ☐ female ☐ Other
2. Age_____
3. University

   _____
4. Major

   _____
5. GPAX
   - ☐ Lower than 1.5
   - ☐ 1.5-1.9
   - ☐ 2.0-2.5
   - ☐ 2.6-2.9
   - ☐ 3.0-3.5
   - ☐ 3.6-4.0
6. How much do you think your near future job or your master degree relate to your bachelor degree?

☐ Closely related ☐somewhat related ☐ not related

7. What sector does your father do for living?
   - ☐ Works in Private company
   - ☐ Works for the government
   - ☐ Business owner
   - ☐ Self-employed
   - ☐ Unemployed
8. What sector does your mother do for living?
   - ☐ Works in Private company
   - ☐ Works for the government
   - ☐ Business owner
   - ☐ Self-employed
   - ☐ Unemployed

9. What sector will you work after you graduated?
   - ☐ Works in Private company
   - ☐ Works for the government
   - ☐ Business owner
   - ☐ Self-employed
   - ☐ Unemployed

10. Do you have family business?
   - ☐ Yes ☐ No

11. [If say yes from last question] what industry is your main family business in?
   - ☐ Agriculture and livestock farming such as cows, pigs, and chickens
   - ☐ Fishing including aquaculture
   - ☐ Mining include coal, iron, steel, general mining, gemstone, quarry and others
   - ☐ Manufacturing of food, textiles, tanning leather, wearing appeal, wood, paper product, media, petroleum product, chemical product, rubber, plastic product, metal product, machinery, equipment, electrical product, automotive, furniture, recycling, and others
   - ☐ Electronic, gas, and water supply
   - ☐ Construction
   - ☐ Wholesale, retail trade, repair of motor vehicles and household goods
   - ☐ Hotel and restaurant
   - ☐ Transport, storage, and communicate
   - ☐ Financial intermediation
   - ☐ Manufactories
   - ☐ Real estate, renting, leasing, and business activities
   - ☐ Public administration and defense; compulsory social security
   - ☐ Education
   - ☐ Health and social work
   - ☐ Other community, social and personal service activities
   - ☐ Private households with employed persons
   - ☐ Extra-territorial organizations and bodies

12. In the end, will you work in your family business?
   - ☐ Yes ☐ No

13. How much do you think your future job or your master degree relate to your family business?

☐ Closely related ☐somewhat related ☐ not related

14. How much do you think your bachelor degree related to your family business?

☐ Closely related ☐somewhat related ☐ not related

Please check the box that best describe your feeling of 'I participate in my bachelor's degree…'

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
15. Because material in the classes interests me.					
16. Because I would get some rewards.					
17. Because I never thought about pursue other degree if I could change the past.					
18. Because I want to get praised.					
19. Because I want to please my parents or my friends.					
20. Because I want to learn some skills that my degree provides.					
21. Because I do not want to feel bad about myself.					
22. Because I have no choices.					
23. Because I believe this degree will get a well-paid jobs.					

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
24. Because I want to learn new thing.					
25. Because I feel ashamed if I cannot get into the university.					
26. Because my parents/ friends/ partners said it is good to pursue this degree.					
27. Because it will benefit my family business.					
28. Because all my friends can get into the university.					
29. Because my score just happened to fit with this degree.					
30. Because the skill I get will benefit me in the future.					
31. Because it is interesting.					
32. Because I enjoy the class at school.					
33. Because I want to improve my skill.					
34. Because I don't want to feel bad about myself.					
35. Because my university reputation					

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
36. Because my friends, my parents, or who I respect study this university or major.					
37. Because this degree is easy to get a job.					

แบบสอบถามประกอบการทำ Senior Research

1. เพศ ☐ ชาย ☐ หญิง ☐ อื่นๆ
2. อายุ _____
3. มหาวิทยาลัย _____
4. คณะ _____
5. GPAX

   ☐ น้อยกว่า 1.5 ☐1.5-1.9 ☐ 2.0-2.5 ☐2.6-2.9 ☐3.0-3.5 ☐3.6-4.0
6. คุณคิดว่างานที่จะหลังจากเรียนจบ(ภายใน1ปี)หรือสาขาวิชาที่จะศึกษาต่อมีส่วนเกี่ยวข้องกับคณะที่เรียนอยู่หรือไม่

   ☐ ไม่เกี่ยวข้อง ☐ ค่อนข้างเกี่ยวข้อง ☐ เกี่ยวข้อง
7. บิดาของคุณทำงานกับหน่วยงานใด

   ☐ บริษัทเอกชน
   ☐ รัฐบาล
   ☐ เจ้าของกิจการ
   ☐ อาชีพอิสระ เช่น ติวเตอร์ นักเล่นหุ้น รับจ้างทั่วไป เป็นต้น
   ☐ ไม่ได้ทำงาน
8. มารดาของคุณทำงานกับหน่วยงานใด

   ☐ บริษัทเอกชน
   ☐ รัฐบาล
   ☐ เจ้าของกิจการ
   ☐ อาชีพอิสระ เช่น ติวเตอร์ นักเล่นหุ้น รับจ้างทั่วไป เป็นต้น
   ☐ ไม่ได้ทำงาน
9. หลังจากเรียนจบคุณจะทำงานกับหน่วยงานใด

   ☐ บริษัทเอกชน
   ☐ รัฐบาล
   ☐ เป็นเจ้าของกิจการ
   ☐ อาชีพอิสระ เช่น ติวเตอร์ นักเล่นหุ้น รับจ้างทั่วไป เป็นต้น
   ☐ ไม่ทำงาน

10. คุณมีธุรกิจครอบครัวหรือไม่

☐ มี ☐ ไม่มี (กรุณาไปข้อ 14)

11. [หากตอบ “ มี ” ในข้อที่ 10] คุณคิดว่าสาขาที่เรียนในระดับปริญญาตรีมีความเกี่ยวข้องต่อธุรกิจครอบครัวหรือไม่

☐ เกี่ยวข้อง ☐ ค่อนข้างเกี่ยวข้อง ☐ ไม่เกี่ยวข้อง

12. คุณคิดว่าอาชีพในอนาคตอันใกล้นี้หรือสาขาที่คุณจะเรียนต่อมีความเกี่ยวข้องต่อธุรกิจครอบครัวหรือไม่

☐ เกี่ยวข้อง ☐ ค่อนข้างเกี่ยวข้อง ☐ ไม่เกี่ยวข้อง

13. ท้ายสุดแล้วคุณจะทำงานกับธุรกิจครอบครัวของคุณหรือไม่

☐ ใช่ ☐ ไม่ใช่

14. ธุรกิจครอบครัวของคุณอยู่ในอุตสาหกรรมประเภทใด

☐ เกษตรกรรม ปศุสัตว์ การล่าสัตว์ และการป่าไม้

☐ การประมง การเพาะพันธุ์สัตว์น้ำ และการเลี้ยงสัตว์น้ำ

☐ การทำเหมืองแร่ เหมืองหิน เหมืองถ่านหิน เหมืองลิกไนต์ และขุดเจาะน้ำมันและก๊าซ

☐ การผลิต อาหาร เครื่องดื่ม ยาสูบ สิ่งทอ เครื่องแต่งกาย กระเป๋า ผลิตภัณฑ์จากไม้ กระดาษ รายการโทรทัศน์และวิทยุ น้ำมัน ผลิตภัณฑ์เคมี ยาง พลาสติก เหล็ก เครื่องจักร เครื่องใช้ไฟฟ้า เครื่องยนต์ เฟอนิเจอร์ ผลิตภัณฑ์รีไซเคิล

☐ การไฟฟ้า ก๊าซ และการประปา

☐ การก่อสร้าง

☐ การขายส่ง การขายปลีก การซ่อมแซมยานยนต์ รถจักรยานยนต์ ของใช้ส่วนบุคคลและของใช้ในครัวเรือน

☐ โรงแรมและภัตตาคาร

☐ การขนส่ง สถานที่เก็บสินค้า และการคมนาคม

☐ การเป็นตัวกลางทางการเงิน

☐ กิจกรรมด้านอสังหาริมทรัพย์ การให้เช่าและกิจกรรมทางธุรกิจ

☐ การบริหารราชการและการป้องกันประเทศ รวมทั้งการประกันสังคม

☐ การศึกษา

☐ งานด้านสุขภาพและงานสังคมสงเคราะห์

☐ กิจกรรมด้านการบริการชุมชน สังคมและการบริการส่วนบุคคลอื่น ๆ

☐ ลูกจ้างในครัวเรือนส่วนบุคคล ☐ องค์การระหว่างประเทศและองค์การต่างประเทศอื่น ๆ และสมาชิก

จงตอบคำถามต่อไปนี้ " ฉันข้าศึกษาในคณะและมหาวิทยาลัยที่กำลังศึกษาอยู่เพราะ...."

"ฉันศึกษาในคณะและมหาวิทยาลัยที่กำลังศึกษาอยู่เพราะ...."	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ปานกลาง	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
15. เพราะฉันสนใจเนื้อหาที่เรียน					
16. เพราะฉันจะได้รับรางวัลบางอย่าง					
17. เพราะฉันไม่คิดที่จะเปลี่ยนคณะที่เรียนถึงแม้ว่าฉันสามารถเปลี่ยนอดีตได้					
18. เพราะฉันจะได้รับการชื่นชมหรือเคารพจากผู้อื่น					
19. เพราะฉันต้องการทำให้ผู้ปกครองหรือเพื่อนพอใจ					
20. เพราะฉันอยากมีความสามารถในวิชาการนี้					
21. เพราะฉันไม่อยากรู้สึกแย่กับตัวเอง					
22. เพราะฉันไม่มีทางเลือกอื่น					
23. เพราะฉันเชื่อว่าหากจบจากคณะและมหาวิทยลัยนี้จะได้รับเงินเดือนสูงกว่าที่อื่น					

	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ปานกลาง	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
24. เพราะฉันต้องการเรียนรู้อะไรใหม่ๆ					
25. เพราะฉันรู้สึกอับอายถ้าหากไม่สามารถเข้าเรียนในระดับมหาวิทยาลัยได้					
26. เพราะผู้ปกครองหรือเพื่อนบอกว่าการเรียนคณะนี้เป็นสิ่งที่ดีเหมาะกับตัวฉัน					
27. เพราะสาขาวิชาที่เรียนจะให้มีประโยชน์ต่อธุรกิจของครอบครัว					
28. เพราะเพื่อนของฉันได้เข้ารับการศึกษาในระดับมหาวิทยาลัย					
29. เพราะคะแนนฉันสามารถเข้าคณะนี้ได้พอดี					
30. เพราะฉันเชื่อว่าความรู้ความสามารถที่ฉันจะได้รับจะเป็นประโยชน์กับฉันในอนาคต					
31. เพราะฉันคิดว่าสาขาวิชานี้น่าสนใจ					
32. เพราะฉันสนุกกับการได้เรียน					
33. เพราะฉันจะมีปัญหาถ้าหากไม่สามารถเข้าเรียนในระดับมหาวิทยาลัยได้					
34. เพราะฉันอยากพัฒนาความสามารถทางด้านนี้					
35. เพราะมหาวิทยาลัยฉันมีชื่อเสียง					

	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ปานกลาง	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
36. เพราะเพื่อน พ่อแม่ หรือคนที่ฉันเคารพเรียนคณะนี้					
37. เพราะสาขาวิชานี้เป็นที่ต้องการในตลาดแรงงาน					