Factors Influencing Successful Doctoral Completion:

A Case Study in Thailand

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I hereby certify that this work has not been accepted in substance for any degree, and
is not being currently submitted in candidature for any degree.

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ชื่อวิทยานิพนธ์   ปัจจัยที่ส่งผลต่อการสำเร็จการศึกษาระดับปริญญาเอก: กรณีศึกษาในประเทศไทย

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บทคัดย่อ

แผนพัฒนาการศึกษาของมหาวิทยาลัยให้ความสำคัญกับอัตราการสำเร็จศึกษาระดับปริญญาเอกซึ่งเป็นประเด็นหนึ่งในการประเมินคุณภาพของมหาวิทยาลัย วิทยานิพนธ์นี้ มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่ส่งผลต่อการสำเร็จการศึกษาระดับปริญญาเอกของบุคลากรมหาวิทยาลัย ข้อมูลหลักได้มาจากฐานข้อมูลบุคลากรที่ได้รับอนุญาตจากมหาวิทยาลัยแล้ว ประกอบด้วยตัวแปรสำคัญคือ เพศ อายุเมื่อเริ่มศึกษาระดับปริญญาเอก ประเทศที่ไปศึกษา สาขาวิชาที่ศึกษา และความสำเร็จของการศึกษา

ข้อมูลอีกส่วนหนึ่งได้มาจากการสำรวจโดยใช้แบบสอบถาม เกี่ยวกับความสัมพันธ์กับอาจารย์ที่ปรึกษา การแนะนำนักศึกษาอื่น ๆ ให้ไปศึกษาในมหาวิทยาลัยนั้น และปัญหาที่พบในขณะที่ศึกษา แบ่งออกเป็น ปัญหาเกี่ยวกับเวลา ภาษา กระบวนการวิจัย เครื่องมือที่ใช้ในการศึกษา เงินทุนสนับสนุนการศึกษา ข้อมูล และอาจารย์ที่ปรึกษา

การวิเคราะห์ข้อมูลใช้การทดสอบไคสแควร์ การสร้างตัวแบบการถดถอยลอจิสติก (Logistic regression model) และการถดถอยเชิงเส้น (Linear regression model) นอกจากนี้ ยังใช้วิธีการสร้างตัวแบบการถดถอยลอจิสติก กรณีข้อมูลแบบกลุ่ม เมื่อมีความถี่เป็นศูนย์ เพื่อให้สามารถวิเคราะห์ด้วยวิธีการทางสถิติต่อไปได้

ผลการศึกษาจากกลุ่มตัวอย่างทั้งหมดพบว่า เพศ ประเทศที่ไปศึกษา และสาขาวิชา
ที่ศึกษา เป็นปัจจัยที่ส่งผลต่อการสำเร็จการศึกษาระดับปริญญาเอกของบุคลากรอย่างมีนัยสำคัญทาง
สถิติ ผลการศึกษาจากแบบสอบถามพบว่า ผู้ที่ศึกษาในประเทศแถบทวีปยุโรป จะประสบปัญหามาก
เกี่ยวกับเวลาในการศึกษา ผู้ที่ศึกษาในกลุ่มประเทศออสเตรเลียและนิวซีแลนด์ และกลุ่มประเทศแถบ
ทวีปยุโรป จะประสบปัญหามากในด้านภาษา ในขณะที่ผู้ที่ศึกษาในประเทศไทย จะประสบปัญหาด้าน
ภาษาน้อย แต่จะพบปัญหาเกี่ยวกับเครื่องมือในการวิจัยมาก ส่วนปัญหาด้านการออกแบบการวิจัย
เงินทุนสนับสนุนการศึกษา ข้อมูล อาจารย์ที่ปรึกษามีภาระงานมาก และอาจารย์ที่ปรึกษาไม่มี
ความสามารถ ไม่พบความแตกต่าง ส่วนคำแนะนำสำหรับการไปศึกษาในมหาวิทยาลัยนั้น ๆ พบว่า
อายุเมื่อเริ่มศึกษาและประเทศที่ศึกษา มีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ผลการศึกษาจาก
กระบวนการวิจัยเชิงคุณภาพพบว่า นักศึกษาที่เลือกหัวข้อวิจัย และเลือกอาจารย์ที่ปรึกษาด้วยตนเอง
มีโอกาสสูงที่จะสำเร็จการศึกษา ถึงแม้ว่าความคิดเห็นของผู้ตอบแบบสอบถามในบางประเด็นจะ
เป็นไปในเชิงลบ แต่ก็ไม่สามารถบ่งชี้ถึงความสำเร็จด้านการศึกษาระดับปริญญาเอกของบุคลากรได้

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ABSTRACT

Doctoral completion rates are of concern to human resources development policy of universities as they endeavor to enhance the academic excellence of their universities.

The purpose of this study is to investigate the factors influencing of doctoral completion success rates amongst staff of a public university in Thailand and focuses on models that include success, difficulties in doctoral studies, relationship with supervisor, and recommendation to further doctoral students.

This study used a data set obtained from staff records maintained by university's human resources department. The data contained individual information on gender, age at commencement of doctoral degree, country, field of study, and doctoral completion status (successful, still studying, and unsuccessful). Another data set was collected using questionnaires regarding recommendation to further doctoral students, student-supervisor relationship, and problems that they perceived in their doctoral studies. The difficulties in doctoral studies were classified into 8 groups; time, language, materials, research design, money and scholarship, data, supervisor availability, and academic efficiency of the supervisor.

The categories of the binary outcome variable, the doctoral achievement, were (1) successful and (2) unsuccessful or incomplete.

The determinant variables include gender, age at the commencement of the doctoral degree, country group of doctoral study, and the major or field of doctoral study.

For statistical analysis, Pearson's chi-squared test was used to evaluate the association between the explanatory variables and the outcome. Fisher's Exact test was used when the data table contained small counts. Logistic regression was employed to model the effects of multiple determinants on doctorate achievement. A data modification method was used to modify the data table by replacing the zero count by 1 and doubling a corresponding non-zero count. Linear regression was employed to model the association between such determinants and the score assigned to the supervisor. Content analysis was employed to cluster reported types of problems.

The results showed that gender, country, and field of doctoral study were significant factors leading to successful doctoral completion, but age at the commencement of a doctoral degree was not a significant factor. The result from responding questionnaires showed that country of doctoral study was statistically significant by associated with problems in time, language, and materials. For problems with research design, money and scholarship, data, supervisor availability, and academic efficiency of the supervisor, no significant differences were found. Age at commencement and country of doctoral study were also statistically significantly associated with the recommendation to further students. Students selecting their own research topics and supervisors for their doctoral degrees appeared more likely to achieve eventual success. Although there were some negative responses indicating common difficulties during the studies, these did not necessarily impact achieving the doctoral degree.

Identification of such factors could be identified for other universities so they can modify their human resources development strategies to support candidates who may be at risk of failure.

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Montri Watthanapradith

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Chapter 1

Introduction

Doctoral completion rates are of concern to human resources development policy of universities as they endeavor to enhance the academic excellence of their universities.

This thesis is concerned with factors affecting doctoral completion among staff in a public university in Thailand, and focuses on models that include success, difficulties in doctoral studies, relationship with supervisor, and recommendation to further doctoral students. It is mixed study consist of quantitative study and qualitative study design. It uses data sets obtained from the university's human resources department, and questionnaires. Qualitative analysis is also carried out.

1.1 Background and rationale

Research and Development in Thailand is a major concern of the Thai government with the particular aim of improving and developing the skills and research capabilities of personnel involved in teaching and research activities in higher education institutions. These concerns were placed on policies on educational development (Office of the National Education Commission [ONEC], 1997). Furthermore, the National Research University Development project has launched a policy to develop academic excellence at nine universities to enhance national competitiveness into world-class universities (Office of the Higher Education Commission [OHEC], 2011; Junpeng & Tungkasamit, 2014).

Universities are main source of research work and research personnel in developing Thailand's higher education's academic excellence, generating new bodies of

knowledges and technologies appropriate to Thailand's needs (OHEC, 2011). University members are encouraged to conduct pure and applied research to support the country's goal of self-reliance for continuing social and economic development (Thaima, 2012).

Staff having attained doctoral completion are benefited for teaching/ research institution and, for individuals. University priorities, plans and policies have subsequently focused attention on employing staff with doctoral degrees. For those who do not have the doctoral degree, the Thai government provides scholarships for university staff to assist them to complete their doctoral degrees both in Thailand and abroad. However, not all of them complete the desired degrees. Doctoral completion rates and times to complete have become a major concern for the Thai national government. Therefore, finding the factors related to successful doctoral completions is essential for the success of Thailand's higher education initiative.

Most studies about doctoral completions have concentrated on doctoral students who enrolled in the host university (Seagram et al., 1998; Wright & Cochrane, 2000; Bourke et al., 2004; Visser et al, 2007; Jiranek, 2010; Wao, 2010; Bain et al., 2011; Wao & Onwuegbuzie, 2011). In aspects of the staff development and the investment of the host university, the doctoral studying of staff was an important concern of the host university. However, there appear no previous studies about the doctoral completion of the host university's staff.

1.2 Research Objective

This study explores the demographic factors and other factors which influence the successful outcome for the doctoral candidates in one public university in Thailand.

The research focuses mainly on quantitative analysis using a statistical method to examine the rate of doctoral completion, considering factor variables that are available to the university database. Moreover, questionnaire data on the supervisor's gender, student-supervisor relationship in terms of opinion about the level of supervisor's care taken to the student, recommendations to further doctoral students, and problems that the doctoral candidates encounters during their doctoral studies, are also investigated. The qualitative research comprises content analysis from in depth interviews about selection of dissertation topic, pairing with a supervisor, supervision provided to the student, student-supervisor relationship, and problems during the doctoral programs.

1.3 Expected advantages of study

The findings from this study will provide useful information for the staff development planning, in particular with respect to postgraduate studies, and assist in formation of strategies which may reduce the risk of failure of doctoral candidates. These findings also could have implications to further doctoral students, in their choices and preparations for their studies, benefiting from the experiences and guidelines that help avoiding or reducing the risk of failure.

1.4 Literature review

Doctoral completion has become a crucial topic for research in higher education and has increased national attention. The existing literature falls into several main categories, including completion rate and time to complete (Lovitts, 2001; Golde, 2005; Visser et al., 2007; Rodwell & Neumann, 2009; Wao, 2010) and attrition rates (Nettles & Millett, 2006; Gardner, 2009; Wamala et al., 2012). The relationship of a

doctoral student with the supervisor is of high interest, for it is among the important key factors affecting doctoral success (Over et al., 1990; Donald et al., 1995; Seagram et al. 1998; Schroeder & Mynatt, 1999; Wright, 2003; Wadesango & Machingambi, 2011). Difficulties experienced in doctoral programs were studied widely (Seagram et al., 1998; Abiddin, 2006; McAlpine et al, 2009; Pyhältö et al., 2012). These factors are important indicators of the efficiency and effectiveness of universities and postgraduate student associations (Wright & Cochrane, 2000; Bourke et al., 2004; Visser et al., 2007; Groenvynck et al., 2013).

1.4.1 Completion and attrition rates

Interest in the issue of doctoral completion has gained considerable momentum in higher education circles over the last few decades. The variation of both attrition and completion rates range by institution and country (e.g. Martin et al., 1999; Lovitts, 2001; Elgar, 2003). It has also been reported that average completion rates for full-time students ranges from 50% to 60% (Martin et al., 1999; Latona & Browne, 2001; Bourke et al., 2004). Over all cumulative ten-year doctoral completion rate in the United Kingdom is reported as 57% (CGS, 2008). Similarly, the completion rate in ten years after American students begin their doctoral program is 56.6% (Sowell et al., 2008). In Australia, an average completion rate is around 50% to 60% (Rodwell & Neumann, 2008). The average completion rate in the Netherlands is around 75% (Van de Schoot et al., 2013). Several studies, conducted by Lovitts (2001), Golde (2005), and Nettles and Millett (2006), report widely varying rates of attrition ranging from 11 to 68% across disciplines. Disciplinary attrition rates, however, range greatly with a low of 24% in the biomedical and behavioural sciences (Pion, 2001) to a high of nearly 67% in the humanities and social sciences (Bowen & Rudenstine, 1992). The

estimated projections regarding doctoral attrition range from 40 to 70% (Bowen & Rudenstine, 1992; Bourner et al. 2001; Abiddin & Ismail, 2011).

1.4.2 Gender

Gender has been considered by many studies for effecting doctoral completion. Women are increasingly taking part in higher education, including doctoral education (Van de Schoot et al., 2013). Recent statistics illustrate that more women are enrolled in higher education even with the greater number than men. In America and Canada, the majority of all graduate students are women. In 2008, women are accounted for 59% of all American graduate students and 53% of all Canadian graduate students. Slightly more than half of American doctoral enrollees are women. It is similar in Canada when 47% of doctoral students are women. The share of women in graduate enrollment increases from 55% in 1999 to 59% in 2008 in America and from 50% to 53% in Canada over the same time period (CGS, 2011). However, several studies have reported that male students complete their degrees more quickly than female students. Nevertheless, Schroeder and Mynatt (1993) showed that female post-graduate students are more likely than males to drop out before completing their degrees. This result agrees with the study conducted by the Council of Graduate Schools (CGS, 2008) which finds that the attrition rate for women enrolled in doctoral programs is higher than men. Norway males have slightly more doctoral completion rates than females (Mastekaasa, 2005). However Seagram et al. (1998) find that there was no gender differences in time to complete doctoral degrees.

1.4.3 Age at commencement of doctoral study

Age at commencement is also considered in doctoral completion. The previous studies report that doctoral candidates under 30 years of age at commencement and age group 31-40 years are more likely to complete rather than withdraw comparing to those over 40 years (Wamala et al., 2012). Wright and Cochrance (2000) find that the age group of 20-26 years at commencement of doctoral study demonstrates higher completion rates and shorter times to complete their doctorate compared to older age groups.

1.4.4 Field of doctoral study

Field of doctoral study is considered in many studies. Gravois (2007) reports that doctoral students in social science take longer to complete than students in engineering and science, consistent with Seagram et al. (1998); Wright and Cochranes (2000) report that the graduates in the sciences complete their studies significantly faster than in the humanities and social sciences but no significant difference is found between the latter two discipline groups. Doctoral candidates register in the arts discipline had a 65% reduced rate of completion and 47% reduced rate of extended candidature rather than withdrawal compared to candidates in the sciences (Wamala et al, 2012).

1.4.5 Supervisor and supervision

The important role of the supervisor is to coach, guide and mentor postgraduate students in research starting from the design all the way until the approved written output (Donald et al., 1995; Wright, 2003; Wadesango & Machingambi, 2011). While the supervisor is responsible for guiding the student, managing the research project is

the student's responsibility (Wadesango & Machingambi, 2011). The relationship of a doctoral student with the supervisor is of crucial, as it is major factors affecting doctoral success (Over et al., 1990; Seagram et al. 1998; Schroeder & Mynatt, 1999; Wright, 2003; Wadesango & Machingambi, 2011). Doctoral students' experiences were studied, including the student's relationship with his or her supervisor; support or lack of it; the supervisor's responsibilities; and supervisory patterns (Wright, 2003; Abiddin, 2006; McAlpine et al., 2009; Pyhältö et al., 2012). Genders of doctoral student and supervisor are another factor. Seagram et al. (1998) shows that fast completers seem to be more involved with their supervisors. It is also found that women graduates are less satisfied with quality of the supervisory experience than men. Nevertheless, more male than female students feel professor interaction is important (Bain et al., 2011). Schroeder and Mynatt (1999) emphasize some advantage to male students and disadvantage to female students associated with having male supervisors. Moreover, female students made negative psychosocial comments about their male supervisors.

1.4.6 Problems experienced

The study in Canada find that postgraduate students perceive difficulty in time issues, such as; lack of time or time management; choosing priorities in the work; slow progress or requiring long time for completion; paid job and other competing non-PhD commitments; number of tasks or activities and time lost due to other people (McAlpine et al., 2009).

Problems with doctoral process study include generic skills, self-regulation, academic writing, and issues related to developing an identity as a researcher (McAlpine et al.,

2009; Pyhältö et al., 2012). The problem in specific expertise related to constructing a theoretical framework; selecting research questions and methods (Seagram et al., 1998; Pyhältö et al., 2012). The study of Seagram et al. (1998) shows that, in the social sciences, there are more difficulties in dissertation topic selection and in conducting research than in the natural sciences. It is also reported that women find the dissertation topic selection easier than men.

A part from that, resources are important to doctoral study progress including problems relating to the lack of funding or other resources and the lack of research instruments (McAlpine et al., 2009; Pyhältö et al., 2012).

Doctoral completion depends on characteristics of students such as responsibility, level of motivation, negative feelings (disappointment, discouragement, fatigue, frustration, anxiety), and health (McAlpine et al., 2009; Abiddin, 2006).

1.5 Structure of the Thesis

This introductory chapter introduces the background and rationale, study objectives, and literature review. The next chapter focuses on the methodology to analyze and model doctoral completion including data structure and statistical methods. The third chapter presents the preliminary results of doctoral completion, modeling, and qualitative results. The last chapter presents summary, discussion, and conclusions.

Chapter 2

Methodology

This chapter describes the methodologies used in investigate factors that associated with doctoral completion. Issues, including difficulties while studying, recommendation to potential students, and relationships with supervisor, are also examined in association with demographic factors. This chapter also includes data sources, data management, doctoral completion, statistical methods, and qualitative analysis.

2.1 Data sources and sample

This study used a data set obtained from staff records maintained by university's personnel department. Data contained individual information on gender, age at commencement of doctoral degree, country, field of study, and doctoral completion status (successful, still studying, and unsuccessful).

The staff were enrolled in doctoral programs in 336 different fields of study in 20 countries (Austria, Australia, Canada, China, Denmark, France, Germany, India, Japan, Korea, Malaysia, Netherland, New Zealand, Norway, Philippine, Singapore, Sweden, UK, USA, and Thailand).

There are 1032 records in the database between 1991 and 2011. Sixty eight moved out to other places. The data set comprised of 964 academic staff enrolled in doctoral programs in universities both in Thailand and abroad.

There are 547 staff completed their doctorate, while 153 staff who did not complete, and 264 staff continuing their studies after year 2011. Those continuing their studies

were excluded from the analysis because their outcomes were still not known. Thus, this study comprises 700 staff with known outcome. Another data set was collected using questionnaires. The questionnaires were sent to 700 staff and 316 responded. In depth interview was used to collect data in qualitative study. Figure 2.1 shows a diagram of the study sample.
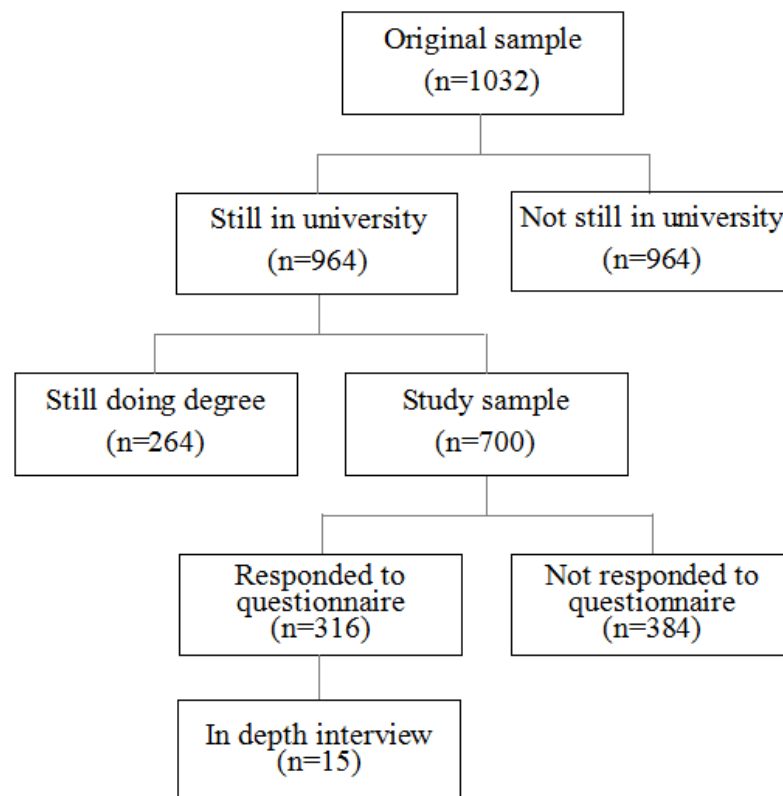
Figure 2.1 Diagram of study sample

2.2 Path diagram

The main outcome of interest is defined as a binary variable. It was whether "successful completion" or "not complete" the degree. Determinants considered were gender, age at commencement of doctoral study (4 categories: under 28 years, 28-31 years, 32-35 years and over 35 years), country group in which they studied (5

categories: Australasia, Europe, USA and Canada, other Asia, and Thailand), and field of study (4 categories: science, applied science and technology, social science, and health science).

Questionnaire was used to collect data about recommendation to potential students (Would you recommend the university program where you studied for your PhD to potential students?), student-supervisor relationship (How well did your supervisor take care for your PhD work?), and problems (What problems do you have during your PhD work?). The supervisor score values ranged from 0 to 10. The open ended items on problems that the doctoral candidates encountered during their doctoral studies were categorized into eight binary variables (time, language, research design, materials, money and scholarship, data, supervisor being too busy, and supervisor unable to supervise).

Qualitative data were also collected in this study. In depth interview was conducted among 15 staff. Information was related to doctoral study, relationship with their supervisor, and problems during the doctoral program. Figure 2.2 shows a path diagram.

Path diagram I

Determinants   Outcomes

| Gender
Age at commencement
Country group of study
Field of study | → | Doctoral completion
(yes/no) |

Path diagram II

Determinants   Outcomes

| Gender
Age at commencement
Country group of study
Field of study | → | Difficulties with
Time
Language
Materials
Research design
Money and scholarship
Data
Supervisor too busy
Supervisor unable to supervise
(mention/not mention) |

Path diagram III

Determinants   Outcomes

| Gender
Age at commencement
Country group of study
Field of study
Supervisor gender | → | Recommendation
(yes/no) |
| | → | Supervisor score
(score 0-10) |

Figure 2.2 Path diagrams

2.3 Quantitative study

Quantitative study was used to investigate factors associated with doctoral completion, difficulties while studying, recommendation to the university, and relationships with supervisor.

2.3.1 Data analysis

For descriptive statistics, the data were presented in terms of frequencies and percentages. Pearson's chi-squared test was used to evaluate the association between the explanatory factors and outcomes. Fisher's Exact test was used when the data table contains small counts.

2.3.2 Logistic regression model

Logistic regression is a statistical method widely used to model the association between a binary outcome probability and a set of fixed determinants. When the determinants are categorical factors, these factors can be structured as a multi-way contingency table of counts and the data for analysis comprise the proportions of binary outcomes in the cells of the table (Hosmer & Lemeshow, 2000; Kleinbaum & Klein, 2002). The logistic model in general takes the following form.

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \sum_{i=1}^{k} \beta_i x_i \tag{1}$$

For a binary outcome of doctoral completion, three determinants with each of which is a factor with two or more levels, the model take the following form.

$$\ln\left(\frac{p_{ijk}}{1-p_{ijk}}\right) = \mu + \alpha_i + \beta_j + \gamma_k \tag{2}$$

where p_{ijk} is the average of doctorate achievement of staff for gender i (male=1 and

female=2), country group of study doctorate j (Thailand=1, Australasia=2, Europe=3, USA and Canada=4, and other Asia=5) and major or field of study doctorate k (Science=1, Applied Science and Technology=2, Social Science=3 and Health Science=4), μ is a constant encapsulating the overall proportion, α_i is the coefficient of gender, β_j is the coefficient of country group of study doctorate, γ_k is the coefficient of major or field of study.

Logistic regression was also used to model other binary outcomes including problems with time, language and research design.

2.3.3 Logistic regression with zero counts

When the contingency table has at least one cell containing a zero count, logistic regression may fail to converge. A data modification method (Dureh et al, 2015, Dureh et al, 2016) was used to solve this problem. The data were modified by replacing the zero count by 1 and doubling a corresponding non-zero count. Table 2.1 shows the contingency table of problem with money and scholarship by gender and country. In this table, 28 mentioned about problem with money and scholarship whereas 288 did not mention. Table 2.2 shows the modification table.

Table 2.1 Contingency table of problem with money and scholarship by gender and country

Not mention (y=0)							Mention (y=1)						
Gender	Country group					Total	Gender	Country group					Total
	1	2	3	4	5			1	2	3	4	5	
M	41	**9**	24	21	12	107	M	5	**0**	1	2	2	10
F	66	**20**	44	33	18	181	F	10	**0**	2	5	1	18
Total	107	29	68	54	30	288	Total	15	0	3	7	3	28

Table 2.2 Modified table by replacing zero by 1 and double a corresponding non-zero

count

	Not mention (y=0)						Mention (y=1)						
Gender	Country group					Total	Gender	Country group					Total
	1	2	3	4	5			1	2	3	4	5	
M	41	**18**	24	21	12	116	M	5	**1**	1	2	2	11
F	66	**40**	44	33	18	201	F	10	**1**	2	5	1	19
Total	107	58	68	54	30	317	Total	15	2	3	7	3	30

Gender: M=male, F=female, Country group of study: 1=Thailand, 2=Australasia,

3=Europe, 4=USA & Canada, and 5= other Asia.

The p-values for testing association between the outcome and determinants with the

data modification method were obtained by logistic regression.

2.3.4 Linear regression model

Linear regression was used to model the relationship between a set of determinants

and score for the supervisors' care of the advisee. The model is as follows:

$$y = \beta_0 + \sum_{i=1}^{k} \beta_i x_i \tag{3}$$

where y is the supervisor score, β_0 is the intercept, β_i are the regression coefficients,

and x_i are explanatory variables.

The logistic and linear regression models were fitted using weighted sum contrasts

(Venables & Ripley, 2002; Tongkumchum & McNeil, 2009) in order to compare

proportions (or means) with overall proportions (or means).

All statistical analyses were performed using R program version 3.0.1 (R Core Team, 2013)

2.3.5 Predictive ability of model

The predictive ability of model is evaluated by mean of area under the receiver operation characteristics (ROC) curve. ROC curve provides predictive accuracy of the logistic model and the area under the ROC curve provides a measure of the model ability to discriminate between those subjects who experience the outcome of interest and those who do not (Sarkar & Midi, 2010).

2.4 Qualitative study

The qualitative study consisted of 15 staff. The 15 subjects were selected by using stratified random sampling in both of successful and unsuccessful doctoral study. There were 7 who had been successful, and 8 who had been unsuccessful, including 7 male and 8 female.

The staff were contacted by email and phone calls to make such appointments. Interviews were conducted in the safe place agreed by the staff and maintain privacy and confidentially. The researcher conducted the interviews and collected participants' narrative via audio recording in relatively structured interviews. Each subject was interviewed once, and all interviews lasted between 45 and 60 minutes. The open ended interview questions were designed to elicit data related to the themes suggested by the literature review. The interviewees were asked about selection of dissertation topic, choosing their supervisor, relationship with supervisor, and problems faced during the doctoral program.

The researcher transcribed and translated the interview recording verbatim and checked the transcripts and translated again the original recording for accuracy. Each transcript was analyzed to protect the identity of the informants. A thematic analysis approach was applied which is the most commonly used method.

Each transcript was read carefully and frequently in thematic approach. Researcher looked for particular pattern, themes, concerns or responses which are posed repeatedly by the participants. Deductive codes were developed prior to the study, based on the study themes, and inductive codes were added during analysis. Quotes illustrating the findings was identified and presented.

Chapter 3

Results

This chapter presents results from preliminary analysis and statistical models. The chapter shows characteristics of study sample based on student demographic factors and questionnaire data. The associations between student demographic factors and doctoral completion as well as problems that doctoral students encountered during their studied are also presented. Results of supervisor gender with student demographic factor association with recommendation for further doctoral students, and supervisor score are presented. The qualitative results are also presented.

3.1 Characteristics of study sample

The study samples comprised of 700 staff. Table 3.1 shows characteristics of the study sample by demographic factors recorded in the database. As regards to gender, 58.4% of the subjects were female. Twenty eight percent started their doctoral degree at age between 28-30 years, 27.6% started their studies at age 35 years or more. Similarly 34.9% studied in Thailand, 23.6% studied in USA and Canada, and 23.1% studied in Europe. Majority of the staff completed their doctoral degrees in applied science and technology at 42.1%, followed by health science at 24%, and social science at 20.1%.

Table 3.1 Distributions of demographic factors

Factors	Total (N=700)	Percent
Gender		
Male	291	41.6
Female	409	58.4
Age at start of doctoral study		
< 28 years	154	22.0
28-31 years	196	28.0
32-35 years	157	22.4
>35 years	193	27.6
Country group of doctoral study		
Thailand	244	34.9
Australasia	65	9.3
Europe	162	23.1
USA and Canada	165	23.6
Other Asia	64	9.1
Major group of doctoral study		
Science	96	13.7
Apply science and technology	295	42.1
Social science	141	20.1
Health science	168	24.0

3.2 Questionnaire data

The questionnaires were used to collected data on the supervisor's gender, student-supervisor relationship in term of opinion about the level of supervisor's care taken to student, recommendations for further doctoral students, and problem that the doctoral candidates encountered during their doctoral studies.

A total of 316 (45.1%) staff responded to the questionnaire. Table 3.2 shows information of 316 staff. Male supervisors were 209 (66.1%) and 107 (33.9%) were female supervisors. More than one-third was male supervisor with female student and only 8.5% were female supervisor with male student. More than 90% of doctoral candidates recommended their supervisor and their universities for further doctoral students.

Table 3.2 Supervisor and student gender and recommendation for further students

Supervisors' gender	Total (n=316)	Percent
Male	209	66.1
Female	107	33.9
Gender combination		
M-m	90	28.5
M-f	119	37.7
F-m	27	8.5
F-f	80	25.3
Recommendation for further		
yes	289	91.5
no	27	8.5

(M/F means supervisors' gender; m/f means students' gender)

The doctoral students' perceptions of typical problems within the doctoral study process were explored with the following open-ended question: "What problem do you have during your PhD work?"

The results shows the problems faced by staff reported were grouped into time, language, materials, money and scholarship, research design, data, supervisor being too busy, and supervisor unable to supervise. Table 3.3 shows the results.

The doctoral students mentioned problems about time management (21.5%) during the whole process of their studies. In the first stage, some students described that they spent a lot of time for defining research question and developing research topic. The concerns about time consuming were also mentioned in other study process such as identifying relevant literature, data collection, and data analysis. Some students also reported that they had not enough time to write thesis. In experimental research, some students mentioned that their research was carried in time-limited laboratory. Some experimental studies were affected by some climate scenarios and it took longer time than expected. Some students majoring in agriculture mentioned that breeding season of some specimens lasted over a long period of time. Some specific laboratory chemical substances were unavailable in Thailand and it took time to order from outside. In some cases, part-time study has become a big issue and concerns in time management.

The doctoral students also mentioned problems in language (22.2%). The problems within this category were often related a lack of academic writing skills. Some students mentioned that it was difficult to write report, especially students majoring in language study such as Korean language study or Chinese language study. Some students mentioned that communication was also a very big problem.

Approximately 10.4% of the doctoral students considered research design as their problematic. The problems within this category were related to concerning methodology, defining research question. Some students described the bounds and definitions of their research scopes were unclear. Qualitative data analysis was also mentioned as problems.

About 10.4% of the doctoral students considered materials for conducting research as their problematic. Some students mentioned the lack of research instruments and tools in their fields.

Approximately 8.9% of doctoral students mentioned problems about money and scholarship. The problems within the category of money and scholarship were often related to a lack of resources, such as a lack of sufficient funding. Some students mentioned that scholarships were given for a short period of time.

The doctoral students also mentioned problems in data (10.8%). The problems related to acquiring data, finding specimens, collecting data, and acquiring academic expertise in the field of study. Finding relevant literature was also difficult.

The problems within the category of supervisor being too busy (9.5%) including a lack of supervision including and no time to advice and approve paper. Moreover, it includes supervisor is famous, having many students, and difficult to find time for thesis supervision. There is a power relationship between a student and a supervisor in terms of academic viewpoints. Some students mentioned that it is difficult to develop independent thinking. Some students mentioned the perfectionist of their supervisor. Also, supervisor had many research projects and supervisor is in executive position.

The problems within the category of supervisor unable to supervise (12.3%) were related to conflict or disagreement in academic idea. Disagreement idea of supervisor and student was influent to relationship and progress. Supervisor moved to other universities, it is difficult to contact. Supervisor was not the expertise in the topic of study that effected to study progress. Supervisor disappears (retired, resigned, and died) was a big problem of students.

Table 3.3 summarizes open-ended question on problems that the doctoral candidates encountered during their doctoral studies. Seventy doctoral candidates (22.2%) mentioned problems with language, followed by 21.5% mentioned problems with time.

Table 3.3 Problems reported by the doctoral students

Perceived Problems	Total	Percent
Time		
Mention	68	21.5
Not mention	248	78.5
Language		
Mention	70	22.2
Not mention	246	77.8
Research design		
Mention	33	10.4
Not mention	283	89.6
Materials		
Mention	33	10.4
Not mention	283	89.6
Money and scholarship		
Mention	28	8.9
Not mention	288	91.1
Data		
Mention	34	10.8
Not mention	282	89.2
Supervisor being too busy		
Mention	30	9.5
Not mention	286	90.5
Supervisor unable to supervise		
Mention	39	12.3
Not mention	277	87.7

3.3 Doctoral completion rates by demographic factors

Doctoral completion was the main outcome of interest. Of the 700 staff, 547 staff (78.1%) had successfully completed their doctorate.

Table 3.4 shows doctoral completion rate by demographic factors. The completion rate was higher for females (83.7%) than males (70.1%). A slightly decreased rate of completion was observed with increasing age at start of doctoral degree. The completion rate varies across countries of study. Studying in European countries had the highest completion rates (88.3%), followed by USA and Canada (86.7%), and Australasia (75.4%). As regards to field of study, the rates ranged from 66.7% for social science to 83.9% for health science.

The Pearson's chi-squared test statistic and corresponding p-value are also shown in Table 3.4. The p-value (< 0.05) indicates that gender, country of doctoral study, and major of study are statistically significant with doctoral completion.

Table 3.4 Doctoral completion rates and association with demographic factors
      (n=700)

Factors	Completion	Non-completion	χ^2	P-value
Gender			18.8	<0.001
Male	204(70.1)	87(29.9)		
Female	343(83.7)	66(16.1)		
Age at start of doctoral study			5.2	0.156
< 28 years	129(83.8)	25(16.2)		
28-31 years	153(78.1)	43(21.9)		
32-35 years	123(78.3)	34(21.7)		
>35 years	142(73.6)	51(26.4)		
Country group of doctoral study			32.8	<0.001
Thailand	169(69.3)	75(30.7)		
Australasia	49(75.4)	16(24.6)		
Europe	143(88.3)	19(11.7)		
USA and Canada	143(86.7)	22(13.3)		
Other Asia	43(67.2)	21(32.8)		
Major group of doctoral study			15.7	0.001
Science	80(83.3)	16(16.7)		
Applied science & tech.	232(78.6)	63(21.4)		
Social science	94(66.7)	47(33.3)		
Health science	141(83.9)	27(16.1)		

Among 316 staff who responded to the questionnaire, there were 264 staff (83.5%) had completed their doctorate. The association between completion rate and demographic factors was shown in Table 3.5. The contingency table of country of study and study completion contains small cell counts. Chi-squared test could not be used for testing the association between completion rate and country group of study. Fisher's Exact test was employed instead to test the association between the

completion rate and country group of doctoral study. Gender and country group of study were associated with doctoral completion.

Table 3.5 Doctoral completion rates and association with demographic factors (n=316)

Factors	Completion	Non-completion	P-value
Gender			0.034
Male	91(77.8)	26(22.2)	
Female	173(86.9)	26(13.1)	
Age at start of doctoral study			0.596
< 28 years	45(86.5)	7(13.5)	
28-31 years	73(86.9)	11(13.1)	
32-35 years	65(80.2)	16(19.8)	
>35 years	81(81.8)	18(18.2)	
Country group of doctoral study			<0.001
Thailand	91(74.6)	31(25.4)	
Australasia	24(82.8)	5(17.2)	
Europe	68(95.8)	3(4.2)	
USA and Canada	55(90.2)	6(9.8)	
Other Asia	26(78.8)	7(21.2)	
Major group of doctoral study			0.410
Science	40(85.1)	7(14.9)	
Applied science & tech.	108(85.7)	18(14.3)	
Social science	45(76.3)	14(23.7)	
Health science	71(84.5)	13(15.5)	

3.4 Problem experiences

Among 316 staff who responded to the questionnaires, 68 (21.5%) staff mentioned about problems with time. The association between the problem with time and

demographic factors are shown in Table 3.6. The p-value (<0.05) indicates that

country group of doctoral study was statistically associated with problem with time.

Table 3.6 Association between problems with time and demographic factors (n=316)

Factors	Mention	Not mention	χ^2	P-value
Gender			2.725	0.099
Male	31(26.5)	86(73.5)		
Female	37(18.6)	162(81.4)		
Age at start of doctoral study			3.973	0.264
< 28 years	11(21.2)	41(78.8)		
28-31 years	12(14.3)	72(85.7)		
32-35 years	21(25.9)	60(74.1)		
>35 years	24(24.2)	75(75.8)		
Country group of doctoral study			12.508	0.014
Thailand	25(20.5)	97(79.5)		
Australasia	5(17.2)	24(82.8)		
Europe	8(11.3)	63(88.7)		
USA and Canada	17(27.9)	44(72.1)		
Other Asia	13(39.4)	20(60.6)		
Major group of doctoral study			0.425	0.935
Science	11(23.4)	36(76.6)		
Applied science & tech.	28(22.2)	98(77.8)		
Social science	11(18.6)	48(81.4)		
Health science	18(21.4)	66(78.6)		

Problem with language was mostly mentioned from 70 staff (22%). Table 3.7 shows

the association between the problem with language and demographic factors.

The p-value (< 0.05) indicated that country of doctoral study is statistically significant

associated with problem in language.

Table 3.7 Associated between problems with language and demographic factors
(n=316)

Factors	Mention	Not mention	χ^2	P-value
Gender			0.001	0.982
Male	26(22.2)	91(77.8)		
Female	44(22.1)	155(77.9)		
Age at start of doctoral study			3.759	0.289
< 28 years	13(25.0)	39(75.0)		
28-31 years	14(16.7)	70(83.3)		
32-35 years	23(28.4)	58(71.6)		
>35 years	20(20.2)	79(79.8)		
Country group of doctoral study			26.295	<0.001
Thailand	10(8.2)	112(91.8)		
Australasia	12(41.4)	17(58.6)		
Europe	24(33.8)	47(66.2)		
USA and Canada	15(24.6)	46(75.4)		
Other Asia	9(27.3)	24(72.7)		
Major group of doctoral study			4.041	0.2571
Science	8(17.0)	39(83.0)		
Applied science & tech.	35(27.8)	91(72.2)		
Social science	12(20.3)	47(79.7)		
Health science	15(17.9)	69(82.1)		

About 10 percent of staff mentioned about problem with research design. There was

no association between the problems with research design and demographic factors as

shown in Table 3.8.

Table 3.8 Association between problems with research design and demographic

  factors (n=316)

Factors	Mention	Not mention	χ^2	P-value
Gender			0.460	0.497
Male	14(12.0)	103(88.0)		
Female	19(9.5)	180(90.5)		
Age at start of doctoral study			0.798	0.849
< 28 years	5(9.6)	47(90.4)		
28-31 years	7(8.3)	77(91.7)		
32-35 years	10(12.3)	71(87.7)		
>35 years	11(11.1)	88(88.9)		
Country group of doctoral study			7.085	0.131
Thailand	10(8.2)	112(91.8)		
Australasia	5(17.2)	24(82.8)		
Europe	5(7.0)	66(93.0)		
USA and Canada	6(9.8)	55(90.2)		
Other Asia	7(21.2)	26(78.8)		
Major group of doctoral study			1.034	0.793
Science	5(10.6)	42(89.4)		
Applied science & tech.	11(8.7)	115(91.3)		
Social science	6(10.2)	53(89.8)		
Health science	11(13.1)	73(86.9)		

Thirty three (10.4%) staff mentioned about problem with materials. The association

between the problem with materials and demographic factors are shown in Table 3.9.

The table comprises small cell counts for country, and major group of doctoral study.

Fisher's Exact test gave p-value less than 0.05 for country group, and major group of

study, indicated that country and major group of study are significant associated with

problem in materials.

Table 3.9 Association between problems with materials and demographic factors

(n=316)

Factors	Mention	Not mention	P-value
Gender			0.149
Male	16(13.7)	101(86.3)	
Female	17(8.5)	182(91.5)	
Age at start of doctoral study			0.385
< 28 years	6(11.5)	46(88.5)	
28-31 years	11(13.1)	73(86.9)	
32-35 years	10(12.3)	71(87.7)	
>35 years	6(6.1)	93(93.9)	
Country group of doctoral study			0.021
Thailand	22(18.0)	100(82.0)	
Australasia	1(3.4)	28(96.6)	
Europe	5(7.0)	66(93.0)	
USA and Canada	4(6.6)	57(93.4)	
Other Asia	1(3.0)	32(97.0)	
Major group of doctoral study			0.017
Science	5(10.6)	42(89.4)	
Applied science & tech.	21(16.7)	105(83.3)	
Social science	2(3.4)	57(96.6)	
Health science	5(6.0)	79(94.0)	

Only 28 (8.9%) staff mentioned about issues with money and scholarship. The

association between problem with money and scholarship and demographic factors

are shown in Table 3.10. This table also comprises zero and small cell counts for age,

country, and major group of doctoral study. The Fisher's Exact test gave p-value less

than 0.05 for major group of doctoral study.

Table 3.10 Associated between problems with money and scholarship and

demographic factors (n=316)

Factors	Mention	Not mention	P-value
Gender			0.880
Male	10(8.5)	107(91.5)	
Female	18(9.0)	181(91.0)	
Age at start of doctoral study			0.077
< 28 years	2(3.8)	50(96.2)	
28-31 years	4(4.8)	80(95.2)	
32-35 years	12(14.8)	69(85.2)	
>35 years	10(10.1)	89(89.9)	
Country group of doctoral study			0.113
Thailand	15(12.3)	107(87.8)	
Australasia	0(0.0)	29(100)	
Europe	3(4.2)	68(95.8)	
USA and Canada	7(11.5)	54(88.5)	
Other Asia	3(9.0)	30(91.0)	
Major group of doctoral study			0.015
Science	3(6.4)	44(93.6)	
Applied science & tech.	9(7.1)	117(93.0)	
Social science	12(20.3)	47(79.7)	
Health science	4(4.8)	80(95.2)	

Thirty four (10.8%) staff mentioned about problem with data. This table also comprises small cell counts for age, and country group of doctoral study. The low P-values (0.001) resulting from the chi-squared tests shows that only major group of doctoral study is significant associated with problem with data that shown in Table 3.11.

Table 3.11 Associated between problems with data and demographic factors (n=316)

Factors	Mention	Not mention	P-value
Gender			0.097
Male	17(14.5)	100(85.5)	
Female	17(8.5)	182(91.5)	
Age at start of doctoral study			0.305
< 28 years	2(3.8)	50(96.6)	
28-31 years	10(11.9)	74(88.1)	
32-35 years	11(13.6)	70(86.4)	
>35 years	11(11.1)	88(88.9)	
Country group of doctoral study			0.860
Thailand	15(12.3)	107(87.7)	
Australasia	2(6.9)	27(93.1)	
Europe	6(8.5)	65(91.5)	
USA and Canada	8(13.1)	53(86.9)	
Other Asia	3(9.1)	30(90.9)	
Major group of doctoral study			0.001
Science	6(12.8)	41(87.2)	
Applied science & tech.	6(4.8)	120(95.2)	
Social science	14(23.7)	45(76.2)	
Health science	8(9.5)	76(90.5)	

Only 30 (9.5%) staff mentioned about problem with supervisor being too busy. The association between the problem of supervisor being too busy and demographic factors are shown in Table 3.12. This table also contains small cell counts for age, and country group of doctoral study. There is no association between problem with supervisor being too busy and demographic factors.

Table 3.12 Associated between problems with supervisor being too busy and

demographic factors (n=316)

Factors	Mention	Not mention	P-value
Gender			0.216
Male	8(6.8)	109(93.2)	
Female	22(11.1)	177(88.9)	
Age at start of doctoral study			0.690
< 28 years	4(7.7)	48(92.3)	
28-31 years	6(7.1)	78(92.9)	
32-35 years	10(12.3)	71(87.7)	
>35 years	10(10.1)	89(89.9)	
Country group of doctoral study			0.751
Thailand	13(10.7)	109(89.3)	
Australasia	2(6.9)	27(93.1)	
Europe	9(12.7)	62(87.3)	
USA and Canada	4(6.6)	57(93.4)	
Other Asia	2(6.1)	31(93.9)	
Major group of doctoral study			0.104
Science	6(12.8)	41(87.2)	
Applied science & tech.	6(4.8)	120(95.2)	
Social science	6(10.2)	53(89.8)	
Health science	12(14.3)	72(85.7)	

There were 39 (12.3%) staff mentioned about problem with supervisor unable to

supervise. The association between the problem with supervisor unable to supervise

and demographic factors are shown in Table 3.13. This table also contains small cell

counts for age at start of doctoral study. There is no association between problem with

supervisor being too busy and demographic factors.

Table 3.13 Association between problems with supervisor unable to supervise and

demographic factors (n=316)

Factors	Mention	Not mention	P-value
Gender			0.479
Male	12(10.3)	105(89.7)	
Female	27(13.6)	172(86.4)	
Age at start of doctoral study			0.649
< 28 years	4(7.7)	48(92.3)	
28-31 years	10(11.9)	74(88.1)	
32-35 years	10(12.3)	71(87.7)	
>35 years	15(15.2)	84(84.9)	
Country group of doctoral study			0.763
Thailand	16(13.1)	106(86.9)	
Australasia	5(17.2)	24(82.8)	
Europe	9(12.7)	62(87.3)	
USA and Canada	5(8.2)	56(91.9)	
Other Asia	4(12.1)	29(87.9)	
Major group of doctoral study			0.526
Science	6(12.8)	41(87.2)	
Applied science & tech.	6(4.8)	120(95.2)	
Social science	6(10.2)	53(89.8)	
Health science	12(14.3)	72(85.7)	

3.5 Recommendation for further students by demographic factors

Among 316 doctoral staff who responded to the questionnaires, 289 staff (91.5%) had

recommended their university program to purse doctoral degrees to potential further

students. The association between the recommendation and demographic factors are

shown in Table 3.14. The data table contains zero and small cell counts for age,

country, and major group of study. Fisher's Exact test gave P-values less than 0.05 for gender, age, and country group.

Gender of supervisor is another determinant for recommendation to further students. Supervisors' and students' gender were combined. Since the effects of supervisors' and students' gender as determinants of recommendation might not be additive, the percentage of male students with female supervisors was low (18.5%) compared the other groups. There is an advantage in combining them into 2 groups (F-m, and other) for modeling.

Table 3.14 Association between recommendation for further student and demographic

    factors (n=316)

Factors	Recommend	Not recommend	P-value
Gender			0.034
Male	106(90.6)	11(9.4)	
Female	183(92.0)	16(8.0)	
Age at start of doctoral study			0.027
< 28 years	50(96.2)	2(3.8)	
28-31 years	81(96.4)	3(3.6)	
32-35 years	74(91.4)	7(8.6)	
>35 years	84(84.9)	15(15.2)	
Country group of doctoral study			0.028
Thailand	108(88.5)	14(11.5)	
Australasia	27(93.1)	2(6.9)	
Europe	64(90.1)	7(9.9)	
USA and Canada	61(100)	**0(0.0)**	
Other Asia	29(87.9)	4(12.1)	
Major group of doctoral study			0.498
Science	43(91.5)	4(8.5)	
Applied science & tech.	113(89.7)	13(10.3)	
Social science	53(89.8)	6(10.2)	
Health science	80(95.2)	4(4.8)	
Supervisors' and students' gender combination			0.266
M-m	84(93.3)	6(6.7)	
M-f	109(91.6)	10(8.4)	
F-m	22(81.5)	5(18.5)	
F-f	74(92.5)	6(7.5)	

The contingency tables between determinants and five outcomes consist of problem

with materials, problem with money and scholarship, problem with data, problem

with supervisor being too busy, and recommendation for further students contain zero cell counts. The data modification method was needed before fitting logistic regression model.

3.6 Results from logistic regression model of doctoral completion

The results of logistic regression model are presented as a graph of confidence intervals of adjusted percentage.

Figure 3.1 shows a plot of crude and adjusted completion rate for each of the demographic factor after fitting the model based on weighted sum contrasts. This method was used particularly to compare each proportion with the overall proportion rather than with a specified reference group.

The horizontal line represents the overall completion rate (78.1%) among 700 doctoral students. The adjusted completion rate for female is higher than overall completion rate. As for the country of study, the adjusted completion rates for Europe, and USA and Canada are higher than overall completion rate, whereas the adjusted completion rate for Thailand is lower than the overall completion rate. Likewise, the adjusted completion rate is lower than overall completion rate for social science.
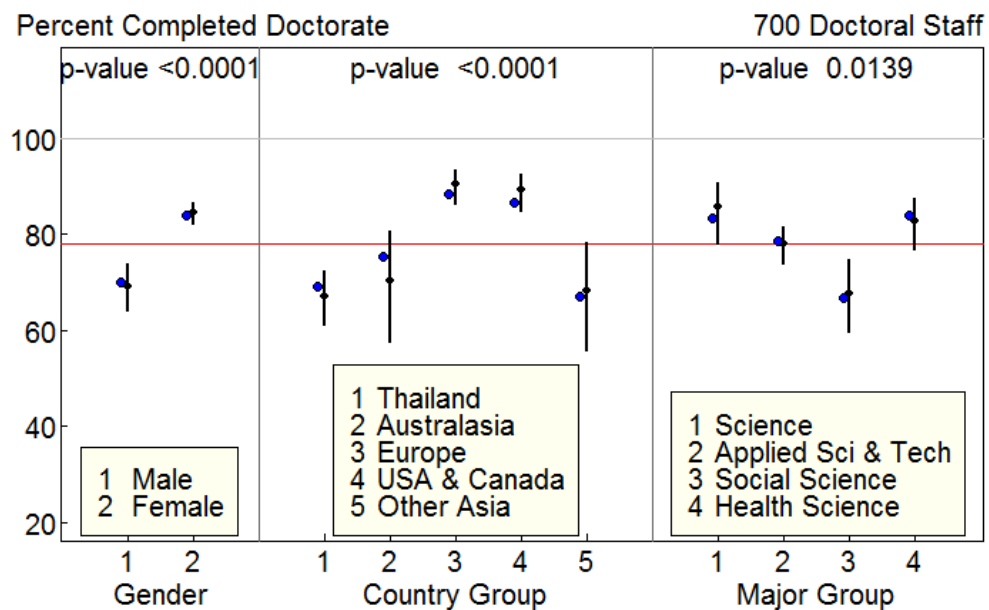
Figure 3.1 Crude and adjusted completion rate with 95% confidence intervals of
completion rate among 700 doctoral candidates

The logistic regression model was separately fitted to each problem at a time with
demographic factors as determinants. For recommendation to further students, the
model was fitted to the data with supervisor-student gender and demographic factors
as determinants.

3.7 Results from logistic regression models of problems and recommendation

Table 3.15 shows P-value from models. Gender and country group of study are
statistically significant associated with doctoral completion. Only country group of
doctoral study is statistically significant associated with problems in time and
language. Country group, and major group of doctoral study are statistically
significant with problems in materials, and money and scholarship. Gender and major

of doctoral study are significant for problem with data. Research design, supervisor being too busy, and supervisor unable to supervise are not statistically significant.

The model for recommendation for further students gave P-value for supervisor-student gender (0.059), age (0.828), country (0.001), and major (0.637).

Table 3.15 P-value from models with doctoral completion and problems

Models	Gender	Age	Country	Major
Doctoral completion	**0.040**	0.824	**0.002**	0.612
Problem with				
Time	0.124	0.193	**0.014**	0.598
Language	0.907	0.182	**< 0.001**	0.608
Research design	0.292	0.899	0.174	0.582
Materials	0.159	0.161	**<0.001**	**0.005**
Money and scholarship	0.487	0.123	**0.048**	**0.032**
Data	**0.045**	0.558	0.904	**0.006**
Supervisor being too busy	0.591	0.659	0.390	0.093
Supervisor unable to supervise	0.429	0.723	0.784	0.464

Figure 3.2 shows a plot of crude and adjusted completion rate for each of the demographic factors, among 316 staff. It gives different results compared to the results from analysis of 700 staff (were shown in Figure 3.1). The horizontal line represents the overall completion rate (83.8%). Only country of study is significant associated with doctoral completion rate. The adjusted completion rates for Europe, and USA and Canada are higher than overall completion rate, whereas the adjusted completion rate for Thailand is lower than the overall completion rate.
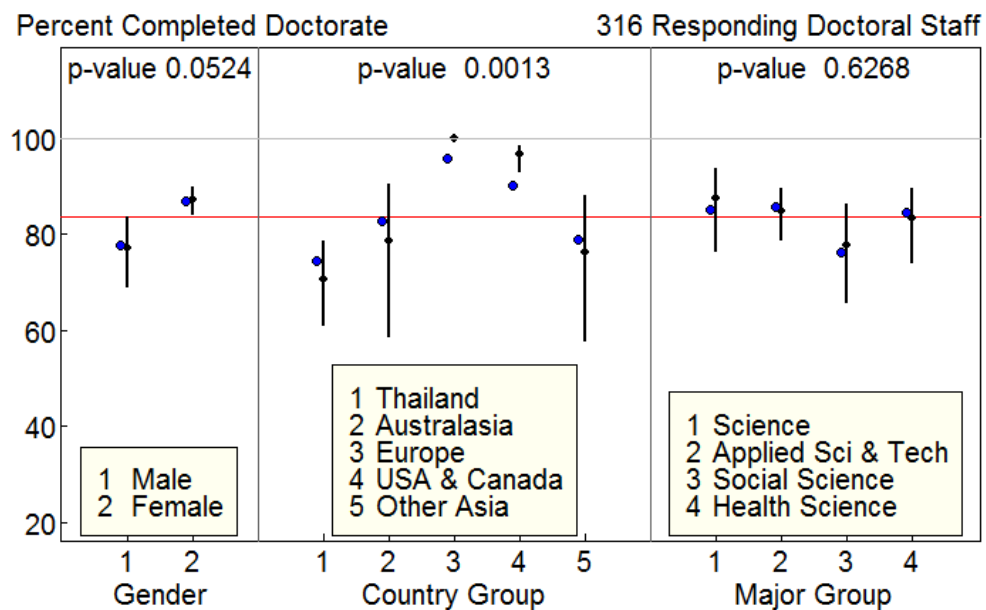
Figure 3.2 Crude and adjusted completion rate with 95% confidence intervals of

completion rate among 316 doctoral candidates who responded to the questionnaire

Figure 3.3 shows a plot of adjusted percentage of student mentioned about problem

with time during their study. The overall percentage of staff who mentioned about

problem with time is 21.5%. As for the country of study, the adjusted percentage of

students mentioned about problem with time for studying in other Asia is higher than

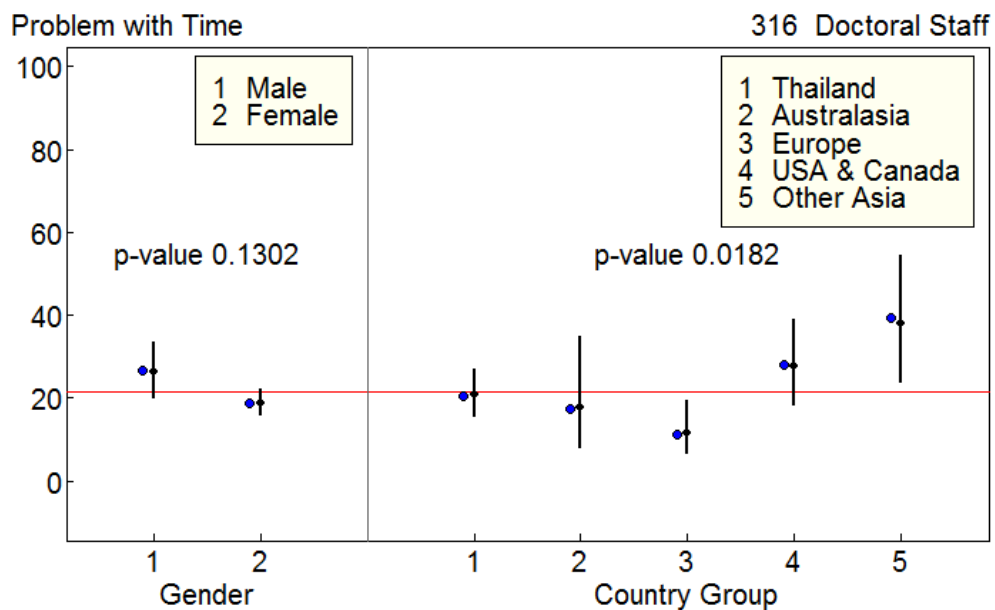overall proportion, and for studying in Europe is lower than overall proportion.

Figure 3.3 Adjusted percentage of student mentioned about problem with time

Figure 3.4 shows a plot of adjusted percentage of staff mentioned about problem with language during their study. The overall percentage of staff who mentioned about problem with language is 22.2%.Only country of study is significant associated with problem with language. The adjusted percentage of student mentioned about problem with language for studying in Australasia, and Europe are higher than overall proportion, whereas the adjusted percentage of student mentioned about problem with language for studying in Thailand is lower than overall proportion.
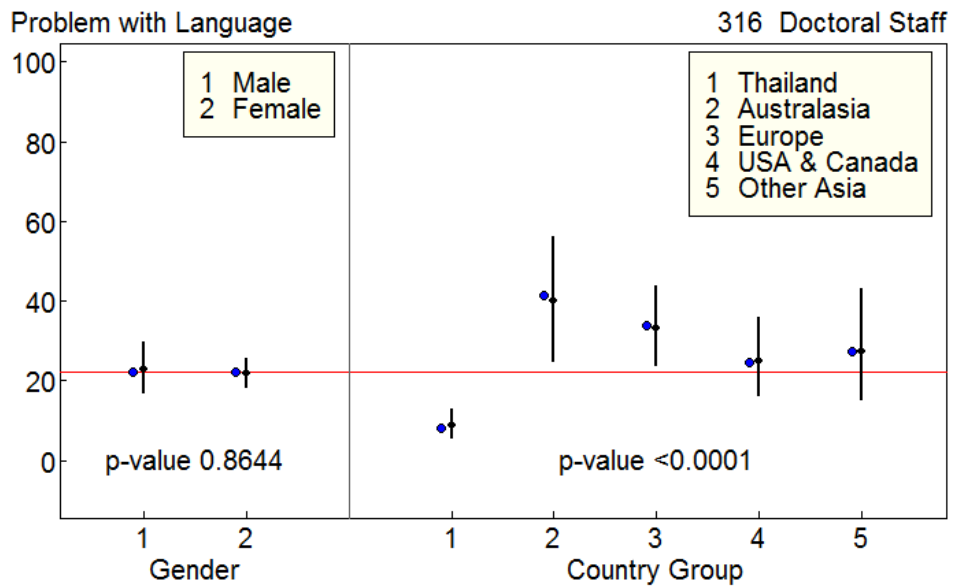
Figure 3.4 Adjusted percentage of student mentioned about problem with language

Figure 3.5 shows a plot of adjusted percentage of staff mentioned about problem with research design. The overall percentage of staff who mentioned about problem with research design was 10.4%. No significant result was found.
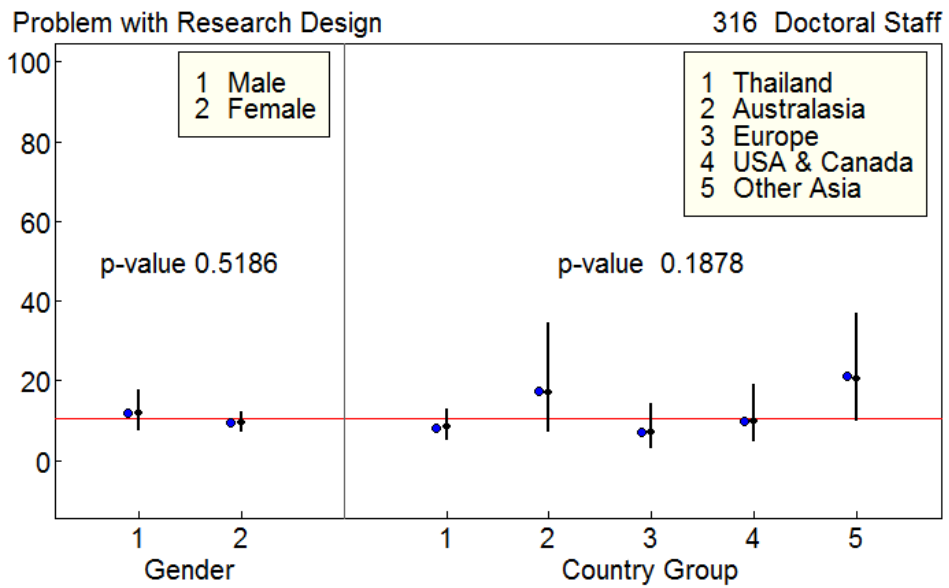

Figure 3.5 Adjusted percentage of student mentioned about problem with research

design

Figure 3.6 shows a plot of adjusted percentage of staff mentioned about problem with supervisor unable to supervise. The overall percentage of staff who mentioned about problem with supervisor unable to supervise was 12.3%. No factors were significant with problem with supervisor unable to supervise. Figure 3.6 shows the results.
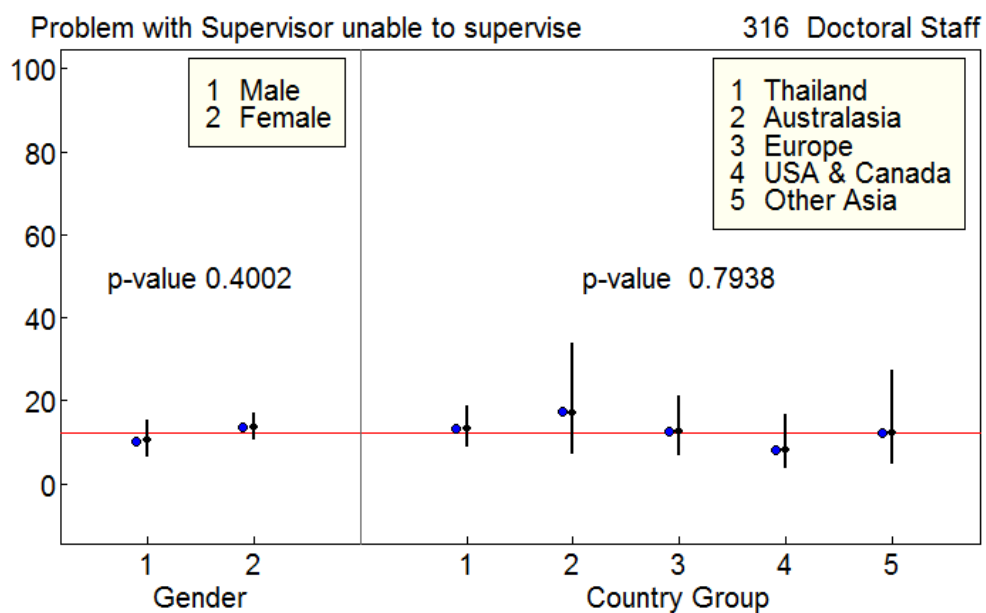

Figure 3.6 Adjusted percentage of student mentioned about problem with supervisor unable to supervise

3.8 Results from logistic regression model with zero cell counts for other problems

Association between demographic factors and outcomes including problems with materials, money and scholarship, data, and supervisor being too busy were analyzed using logistic regression model with zero cell counts. Figures 3.7 to 3.10 show results.

Figure 3.7 shows a plot of adjusted percentage of staff mentioned about problem with materials during their study. The overall percentage of staff who mentioned about problem with materials was 10.4%. The adjusted percentage of staff who mentioned

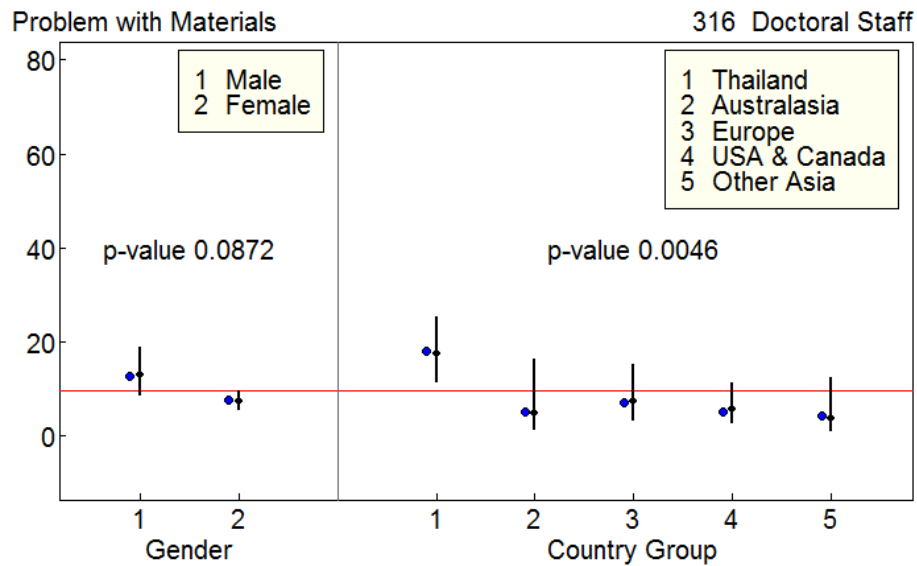about problem with materials is higher than the overall proportion for studying in
Thailand.

Figure 3.7 Adjusted percentage of student mentioned about problem with materials

For problems with money and scholarship, data, and supervisor being too busy, no
significant result was found. The results are shown from Figure 3.8 to Figure 3.10.
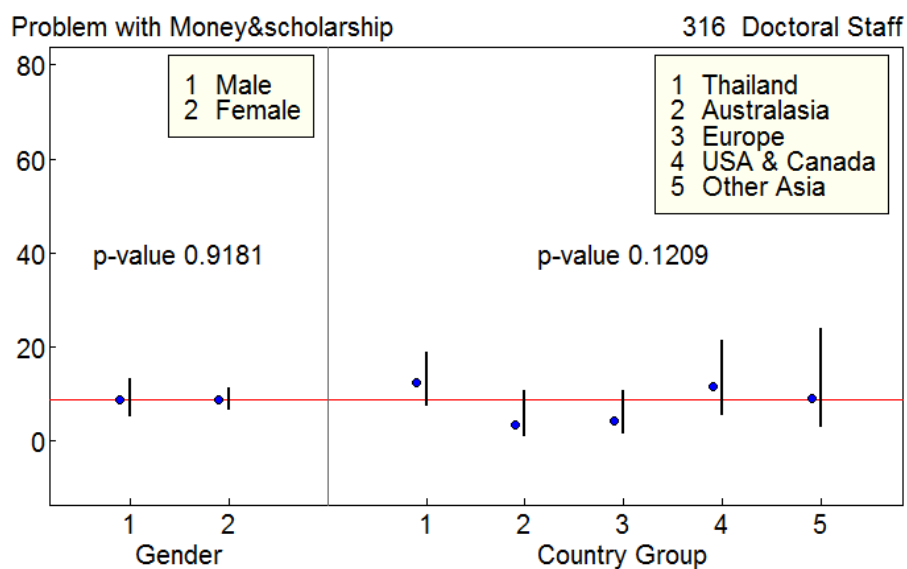

Figure 3.8 Adjusted percentage of student mentioned about problem with money and
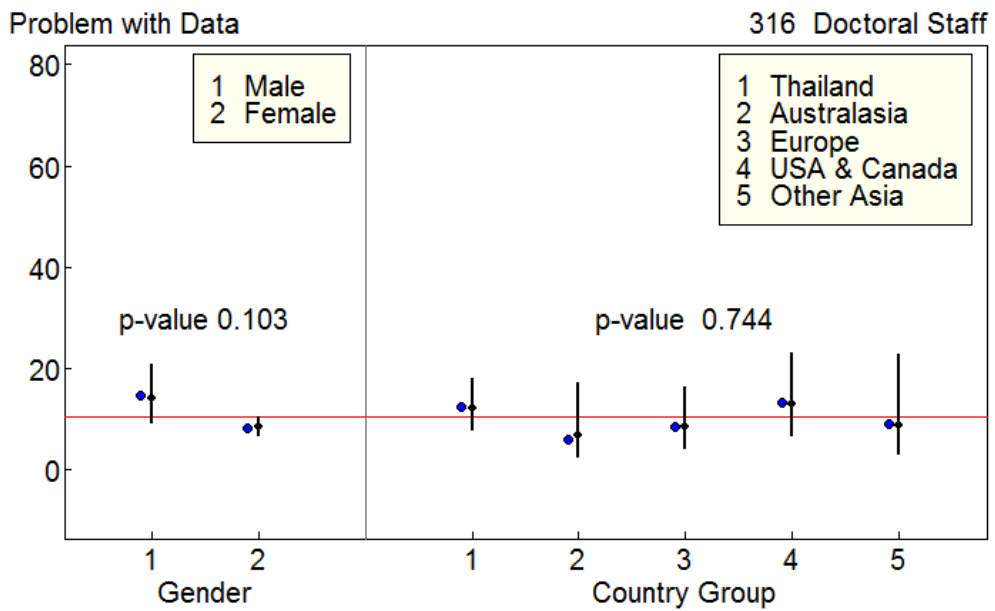scholarship

Figure 3.9 Adjusted percentage of student mentioned about problem with data
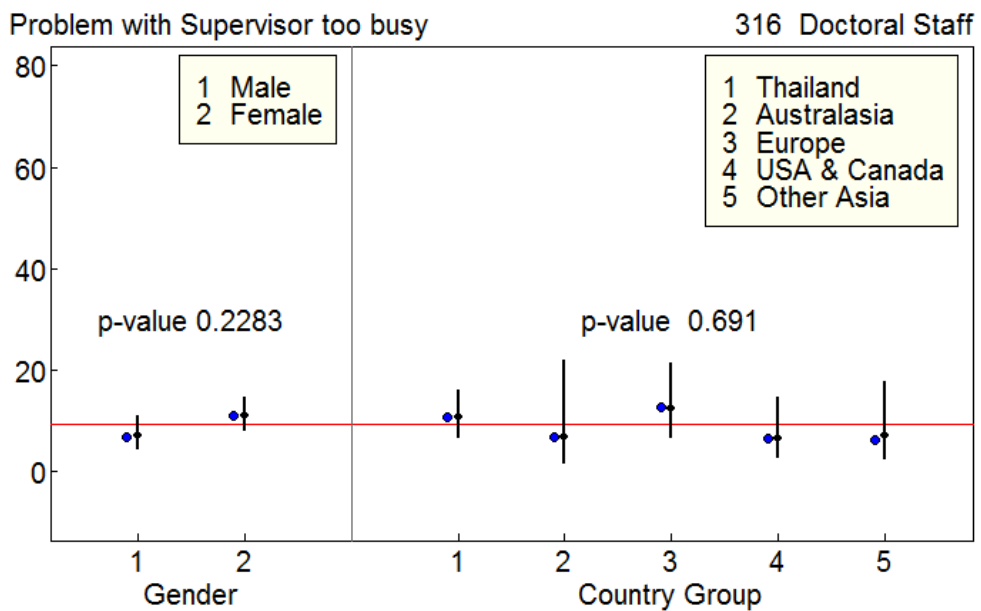
Figure 3.10 Adjusted percentage of student mentioned about problem with supervisor

being too busy

The association between each problem with gender and country group was further investigated. Since the number of cases is quite small for each country. Thus, country of doctoral study was regrouped as a binary factor (Thailand or other). Logistic regression was fitted to the data. Figure 3.11 shows the results. Country of study is signification of problem with language and problem with materials. The high percentage for problem with materials is observed among doctoral candidates who studied in Thailand, whereas the low percentage is observed for problem with language compared to overall proportion.
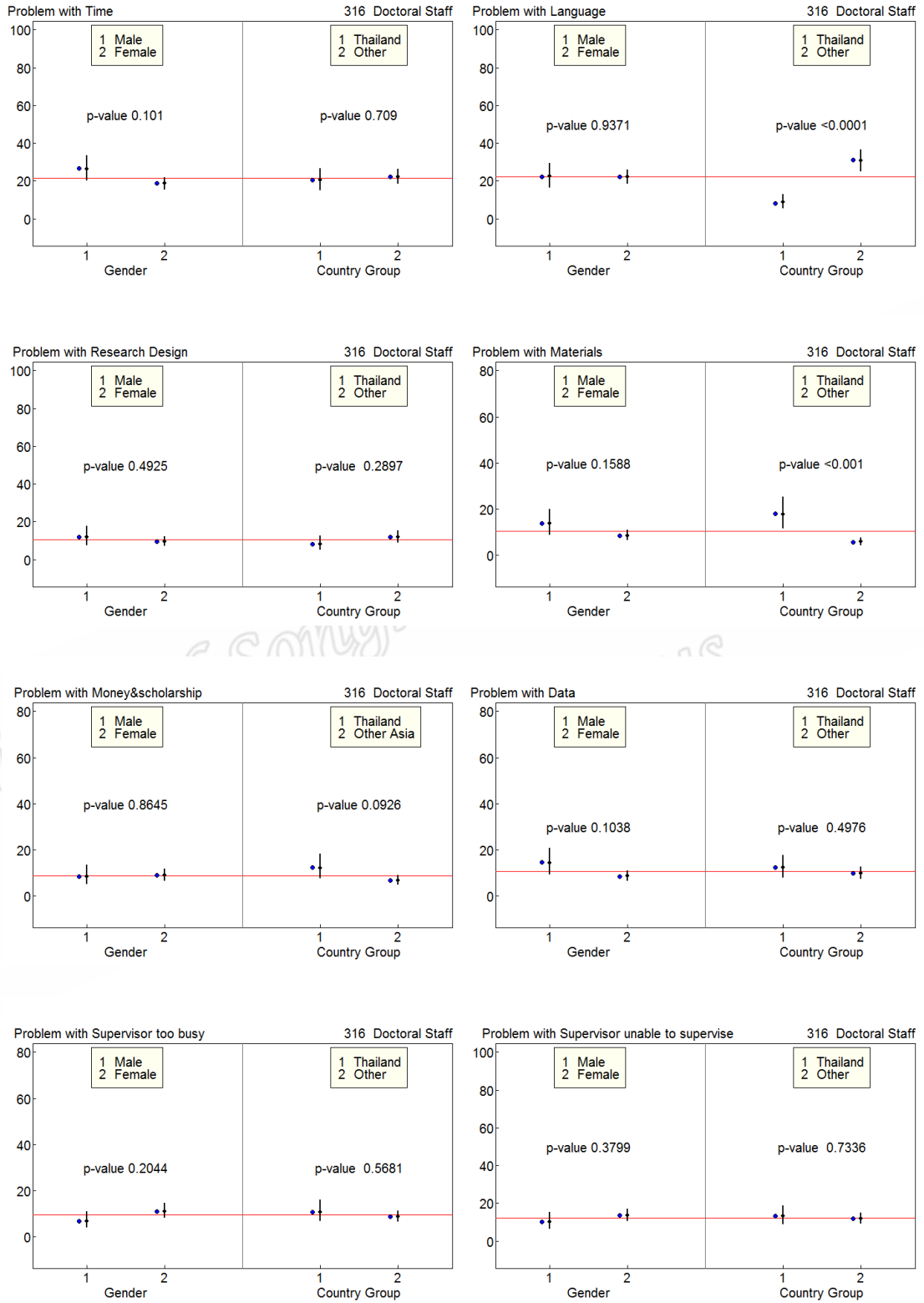
Figure 3.11 Adjusted percentage of student mentioned about problems with combined country group

3.9 Model Evaluation

The ROC curves for logistic model of doctoral completion were shown in Figure 3.12. The ROC curve for model with three determinants (gender, country group, and major group of study) was drawn in the black line. The red, green and blue lines represent the ROC for model with each determinant consisting of country group of study, gender, and major group of study respectively. The diagonal line represents null model.

The model with three determinants gives 84.3% sensitively, 41.8% specificity, and an AUC of 0.41. It indicates that the model offers moderate predictive ability. The AUC of model with country of study as a determinant is 0.30. The AUC of model with gender as a determinant is 0.20. The AUC of model with major group of study as a determinant is 0.18.
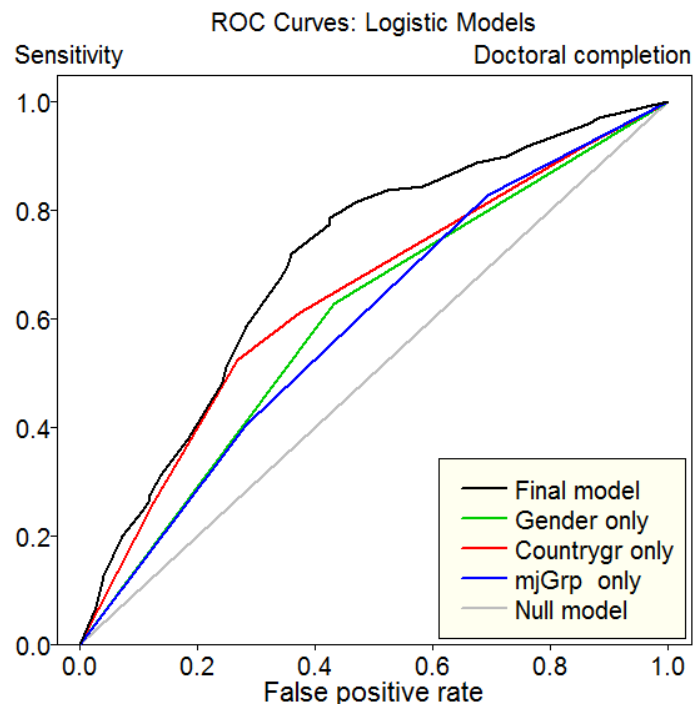
Figure 3.12 ROC curve for full model of doctoral completion

3.10 Results for recommendation for further doctoral students from logistic regression model with zero counts

The supervisor-student gender combination and country group of study were used as determinants. Figure 3.13 shows a plot of crude and adjusted percentage of recommendation for further doctoral students after fitting the model based on weighted sum contrasts.

The overall percentage of recommendation for further doctoral student was 91.5%. The adjusted percentage of recommendation for male with female supervisor tends to be lower than the other groups. However, it is not statistically significant.
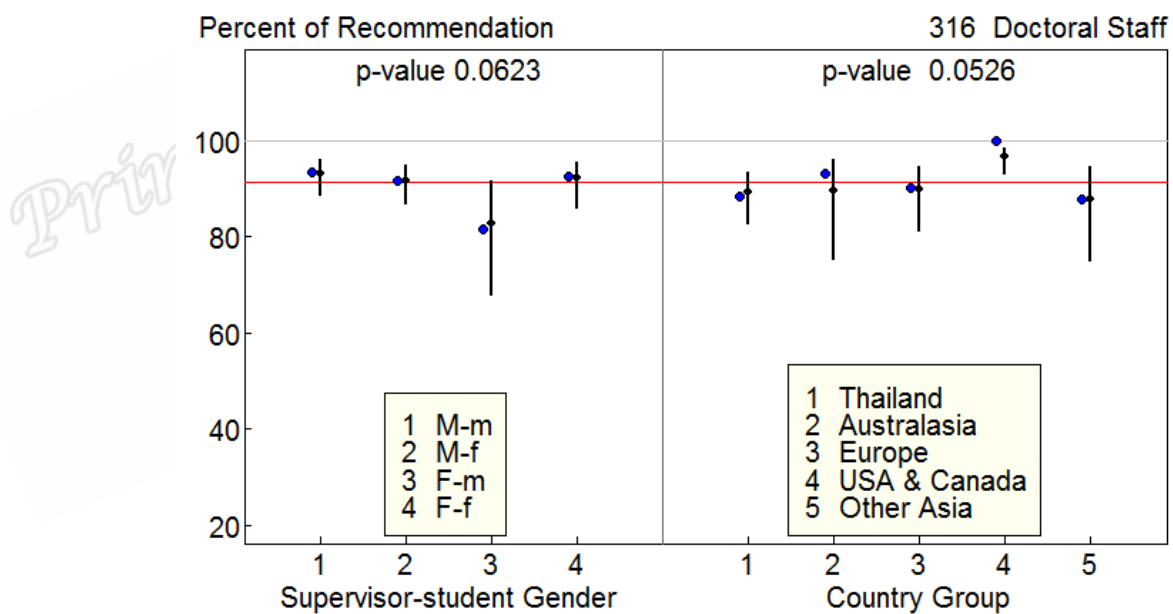
Figure 3.13 Crude and adjusted percentage of recommendation for further doctoral student with 95% confidence intervals among 316 staff who responded to the questionnaire

Supervisor gender and student gender was regrouped into male student and female supervisor (F-m), and other. As for the combination gender, the adjusted percentage of recommendation for further student with male student with female supervisor is lower than overall proportion. Figure 3.14 shows the results.
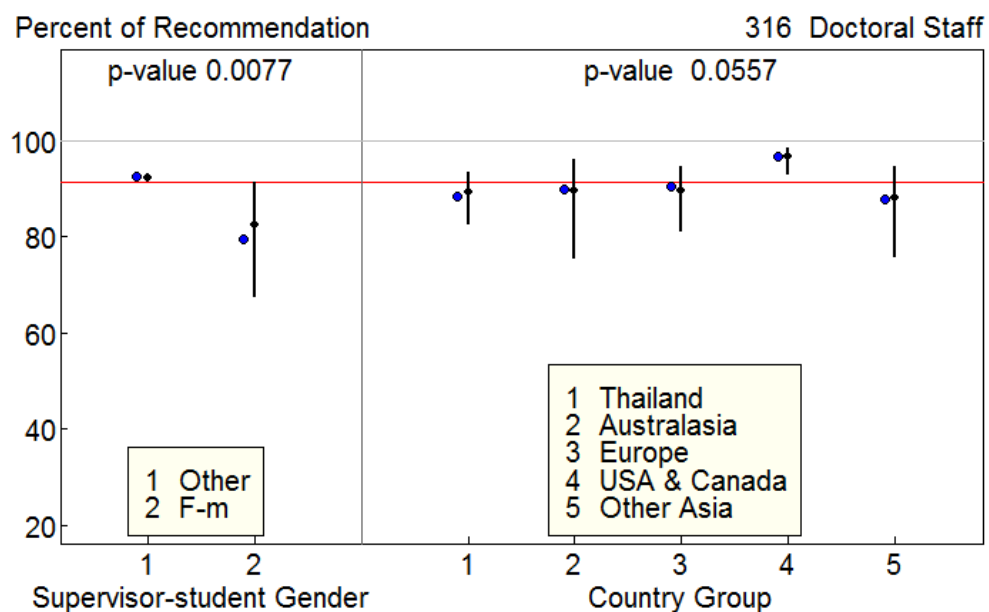
Figure 3.14 Crude and adjusted percentage of recommendation for further doctoral student with 95% confidence intervals with combination gender

3.11 Linear regression model results of supervisor score

As regards to supervisor score, majority of staff (74.4%) gave scores ranging from 8-10 for their supervisors taken care of them. The mean score is 8.25 and standard deviation is 1.73.

For the linear model of supervisor score, the determinants were supervisor-student gender and demographic factors. Figures 3.15 - 3.18 show a plot of adjusted score about the level of supervisor's care taken to their students for each of the demographic

factors after fitting the linear regression model based on weighted sum contrasts. This method was used particularly to compare each mean of score with the overall mean rather than with a specified reference group.

The models were fitted separately for 264 successful staff and for 51 non-completion staff. The overall mean is 8.37 for the successful staff and 7.64 for the unsuccessful staff. Country of study is significant among successful staff. The adjusted score is higher than overall percentage for studying in USA and Canada.
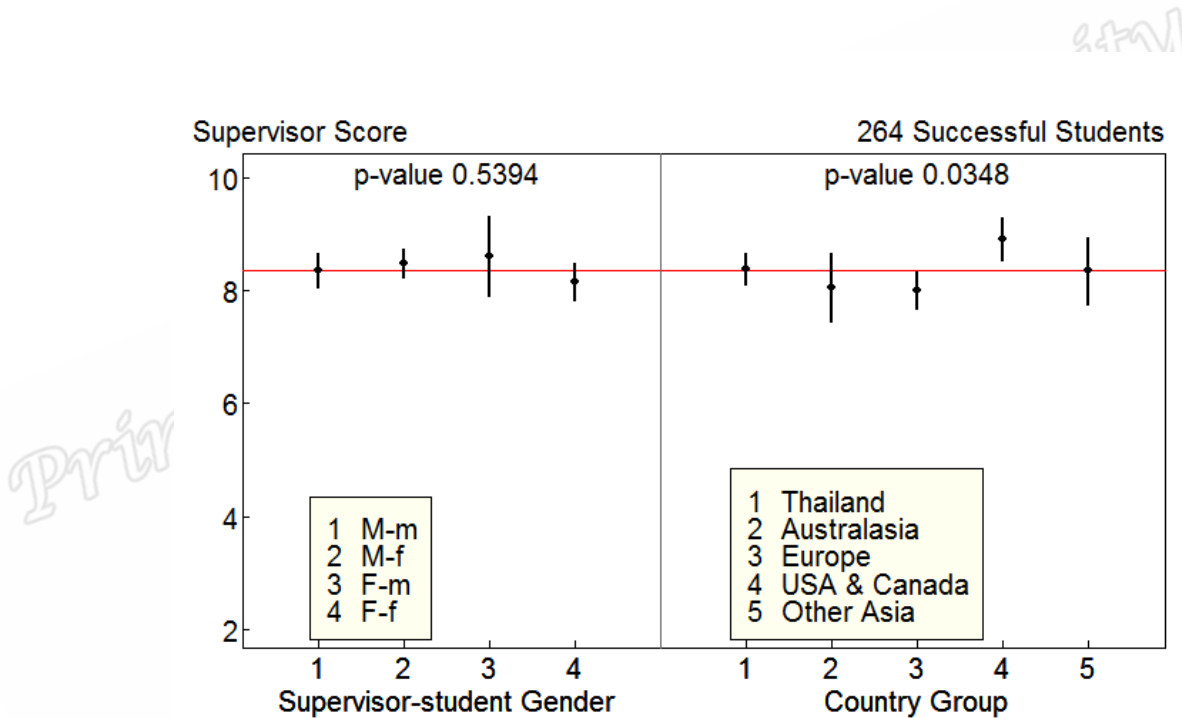
Figure 3.15 Adjusted score about supervisor's care taken to successful students
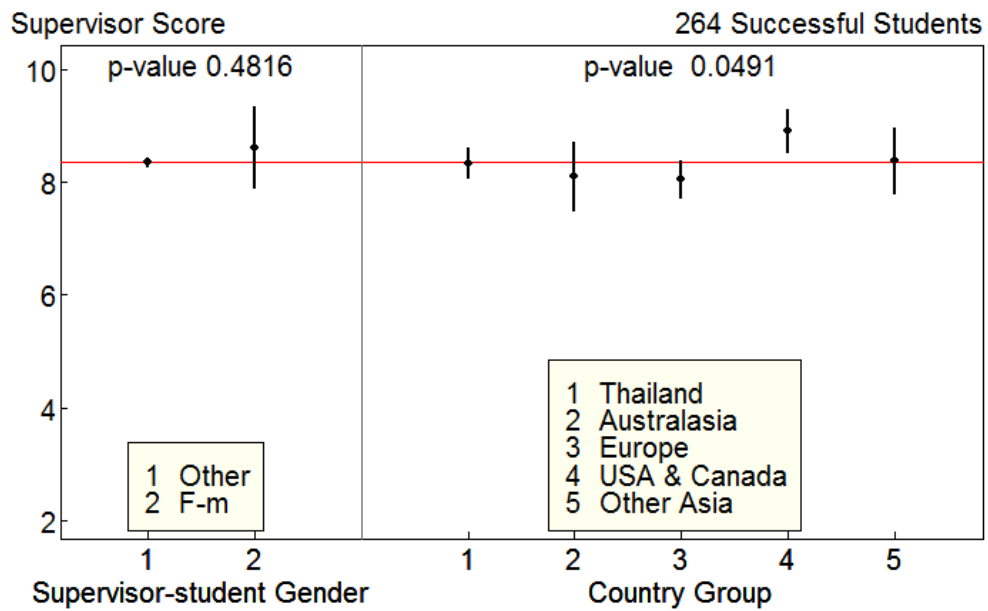
Figure 3.16 Adjusted score about supervisor's care taken to successful students with

gender combination
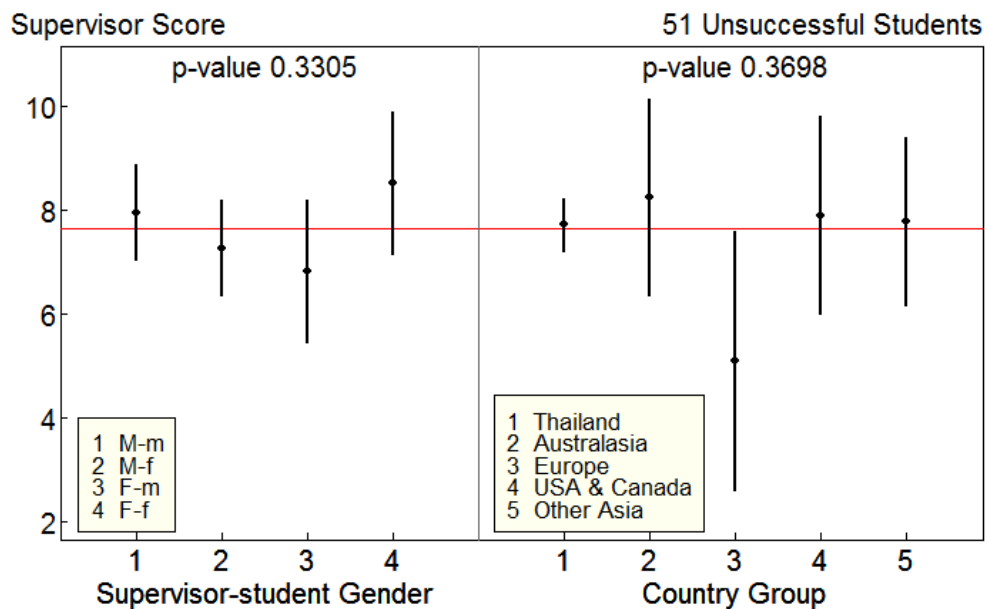
Figure 3.17 Adjusted score about supervisor's care taken to unsuccessful students
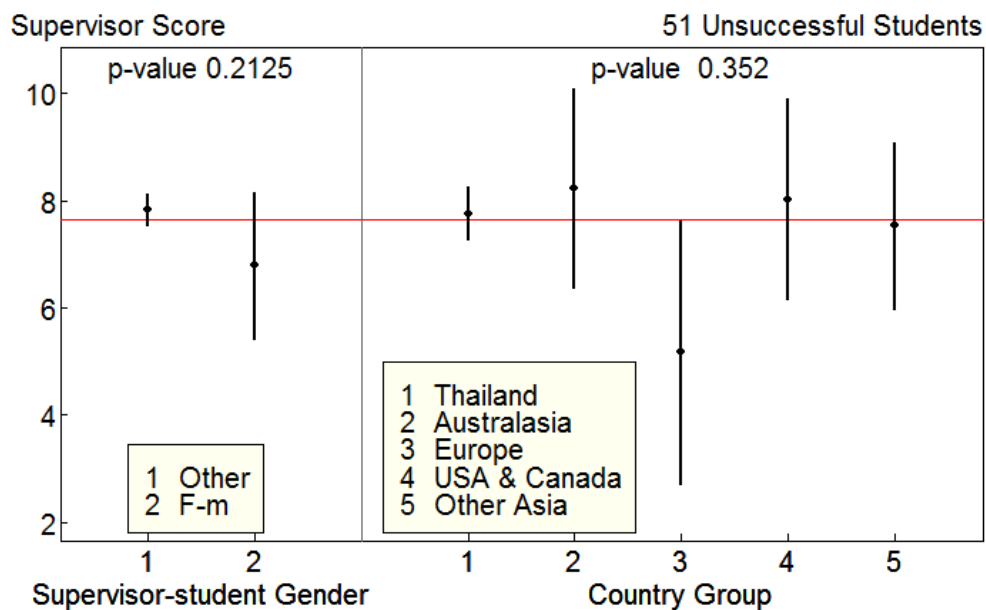
Figure 3.18 Adjusted score about supervisor's care taken to unsuccessful students with gender combination

3.12 Findings from qualitative study

This study identified five critical areas of concern by 15 doctoral staff, in relation to success in their degree program. These identified categories were selection of dissertation topic, pairing with a supervisor, supervision provided to the student, student-supervisor relationship, and problems during the doctoral program.

3.12.1 Selection of dissertation topic

Five of the seven successful staff interviewed independently chose their own topics. Of the eight unsuccessful staff who were interviewed, five claimed that their topics were determined by either the supervisors or the scholarship funder, and there were lack of expert to support them. Three failed doctoral staff claimed to have chosen their topic themselves but they too cited problems with contact to experts in their

topic area. Selecting one's topic oneself did not guarantee success, nor was it a necessary requirement, but it was appear to be a relevant factor.

3.12.2 Pairing with a supervisor

The pairing with supervisors fell into two types, the selection of advisor done by the students themselves (possibly with suggestions from others), or done by the faculty. The way of selection of supervisor or pairing was affected success or failure. Six of those successful in obtaining their degrees selected their supervisor by themselves.

> *"I heard his name and read his papers when I studied for a Master's degree. He taught a subject. I asked him to be my supervisor".*

> *"...I read many research papers of my supervisor that related to my interests. Then, I wrote an email to him".*

> *"...My doctoral supervisor was my Master's degree supervisor".* Five out of the eight failures got their supervisor from suggestions by others. Two were set by the doctoral program (faculty) and could not be changed afterwards.

> *"...My Master's degree supervisor declared himself to be my doctoral supervisor".*

> *"...The doctoral program assigned the supervisors to students. Each supervisor was allowed a limited number of advisees, so I could not switch to another supervisor".*

Only one staff changed the supervisor. However, it was not because of any conflict, instead his supervisor moved back to home country and the co-supervisor took over the duties.

3.12.3 Supervision provided to the student

Three successful staff stated that their supervisors were experts in the field, always advising and following the students' progress. The six failures had negative opinions regarding the supervision. They stated that their supervisors had too many students to advice. Two successful subjects had supervisors with many advisees but they stated that students should take responsibility for their own success or failure.

> *"...My supervisor had many students, and sometimes he forgot about the last discussion and assignment. We made agreement of regular contact before starting the work: set a schedule for progress reports, used social media to contact during his trips abroad".*

> *"...My supervisor was the university's president. She had no time to support me. I felt pressure from friends but some of them assisted me. I had eleven published research papers without assistance from my supervisor."*

3.12.4 Student-supervisor relationship

It was emerged from the above and related aspects of the interviewee responses were a clearer picture of the ways in which the supervisor's role is critical. The survey data provided no clear differentiation, in terms of success or failure in doctoral studies, between having a stated "good relationship with the supervisor" and "not having good relationship". It became clear in the interviews was that most staff do form a positive emotional relationship with their supervisor. Sometimes this is at a social level and not always devalued by the separate matter of the supervisor's level of impact on progress in the doctoral studies.

> *"...I have had a 'good relationship' but very limited assistance".*

"...The relationship with the supervisor was "not a problem". He (her supervisor) gave insufficient time and assistance, referred me to another student who actually couldn't help me, and to a colleague who was very limited in terms of both knowledge and common language".

"...My supervisor was 'nice' but providing no help (to me) or advice".

"...There was a 'good relationship' with my supervisor, but I received limited assistance due to his (the supervisor's) poor knowledge of the research topic".

The need for expert support to the doctoral study, provided by a person or persons prepared to assist emerged commonly as a factor in the interview responses. Among the successful ones, this support was gained from the supervisor by 4 subjects. The last three described their own supervisor as being "the best". Three interviewees were successful in gaining their doctoral degrees, but expressed some reservations about their supervisor's ability or preparedness to assist. They also said that they get benefited from friends such academic support that others gained from a good supervisor. Of the interviewees who had been unsuccessful as doctoral students, six mentioned perceived severe deficiencies in the level of assistance from their supervisors, and the seventh such subject had clearly also been dissatisfied to the extent of having requested a change of supervisor.

Interview responses in this area suggest that the levels of assistance or pressure from friends could be significant factors, and should be explored for further studies. Also regular structured reporting on progress, with expectations of structured steps (e.g. the supervisor requesting a work plan for the next week), appeared important, in contrast to a more informal supervising style.

3.12.5 Problems during the doctoral program

Health problems could influence an individual, although it was not always clear to what extent these are causes or consequences of difficulties with the doctoral studies. One of them mentioned health issues as a causal factor, a made a reference to emotional depression on returning from the studies that had failed. Even six or ten years after discontinuing the pursuit of doctoral degree, subjects were clearly distressed in the interviews. Such cases highlight the desirability of identifying factors affecting, and improving the likelihood of success in doctoral studies. Scientific instruments used in the doctoral study were also attributed for failure in the program. One of failures stated that her research required use of a scientific instrument not available in Thailand, so she went to North America, but had to pay high fees for testing services. The other one of failures stated that his doctoral research had international funding that dictated the framework of research and emphasized pursuit of innovations, eventually impacting his progress negatively.

Chapter 4

Discussions and conclusions

This study examined factors associated with the achievement of a doctoral degree of the university academic staff. The factors associated with difficulties while studying, recommendation the university to potential further students, and relationships with supervisor were also examined.

The results showed that the completion rate of doctoral degree of the university's staff was 78.1%. Gender, country of study, and field of doctoral study were associated with successful doctoral completion, however, age at the commencement of a doctoral degree was not associated with doctoral completion. The results from the models of problems doctoral students perceived during their studied revealed that country of doctoral study was associated with problems in time, language, and materials. The results from the model of recommendation demonstrated that proportion of recommendation was lower for the category of male student with female supervisor. The model of supervisor score among successful students showed that country of doctoral study was a predictor of supervisor score. Qualitative results revealed that staff selecting their own research topics and supervisors were more likely to achieve eventual success. There is no clear difference in success between students satisfied with the care given by the supervisors and those not satisfied.

4.1 Discussions

The completion rate observed in this study was hard to compare with other studies because the subjects in this study were staff from one public university in Thailand

whereas the prior studies focused on doctoral students who enrolled in the host universities (Wao, 2010; Bain, et al., 2011).

Females had higher achievement rates than males, both in absolute numbers graduating with doctorate degrees and in the proportions of successful completions after commencement. Female staff at this university outperformed the male staff in doctoral studies. Similarly, the study by Martin et al. (1999) reported higher in completion rates among females. This is, in contrast to some other findings (Schroeder & Mynatt, 1993; CGS, 2008). However, Castro et al. (2011) reported that females had higher graduation rates at most levels of education in America, though not at doctoral level. As to whether the gender difference in doctoral study found in this study is true of the whole country and elsewhere remains to be researched further.

Majoring in science and health science at a doctoral level was a significant advantage in terms of likelihood to succeed whereas majoring in social science was a significant disadvantage in terms of likelihood to succeed. This findings agreed with a study in Canada which indicates that discipline was important for completion, and that those studying in humanities were less likely to complete than those studying in science (Elgar, 2003), as well as with a study of doctoral completion rate in United Kingdom (Wright & Cochrane, 2000) and a study of doctoral international students studying in America (CGS, 2008). The reasons could be due to the fact that in natural sciences, the theses are based on the outcomes of specific experiments and/or observed phenomena while in the social science, the dissertations are often based on the strength of the arguments of certain phenomena. Anecdotal evidence seems to suggest that within the social sciences, the research topics tend to be less specific and this causes difficulties for doctoral students in gaining a clear and definite focus in their

research. Heath (2002) claimed that higher doctoral achievements of science, and science and technology students could be due to the specificity of their studies, but statistically there was no significant difference between these groups in this study.

Studying in Europe, and USA and Canada was associated with successful completion of doctoral degrees. It would be interesting to investigate the factors influencing students' choice of place of study whereas studying in Thailand was a significant disadvantage in terms of likelihood to succeed. Confounding factors such as academic ability or previous academic success might have affected access to scholarships to study in another country. Alternatively, those with more significant commitments in addition to their studies, ones that might diminish available study time, might be more reluctant to leave Thailand. Such commitments might include family commitments or the requirement to maintain employment. As the foreign students in other country, they might have higher motivation to succeed because they might be prevented their visa status.

The possible advantage in commencing studies at a younger age was not statistically significant in this study. Wright and Cochrane (2000) found that the science doctoral student starting younger, age group (20-26 years), demonstrated higher completion rates and shorter times to complete their doctoral degrees,however, no effect was found in arts and humanities.

The results showed that doctoral students perceived problems varied. The problems most often mentioned were related to language and time. The problems with language are possibly common for Thai students studied in other countries. This is supported by previous study (Noom-ura, 2013). The problems with time management are related to

self-regulation and motivation (Pyhalto, 2012). These suggested that more attention should be focused on language and time issues in developing the practices of doctoral education.

This study found that difficulties with time, language and materials varied between country groups of study. Studying in Europe was associated with less mention problem with time. There were no class and course requirements for a doctoral study in many European universities. Doctoral student was considered to be a full-time job in many of the universities in Europe. Problem with time was also mentioned in the study of female doctoral students in the US (Moyer et al, 1999).

Many students expressed the view that they face problems with the study language. More participants who studying in Australasia and Europe mentioned problem with language. Many European countries have their own languages and lead to communication problem among Thai students. Thai students lacked confidence in their mastery of appropriate English language. English is the dominant international language in Thailand, but Thai people communicate by using Thai language in their daily lives, so their proficiency in English is not well developed. Studying outside Thailand, English was used to communicate, and to write papers and thesis. An effective communication is one of the criteria to build up a good relationship between supervisor and student. Miscommunication happened when students do not have high proficiency English communication level (Yeho & Doan, 2012). Similar to international students who studied abroad, English language skills such as writing ability, understanding and speaking English adequately were a source of stress (Wan et al., 1992; Adrian-Taylor et al., 2007; Jang, et al., 2014). English proficiency was also the biggest challenge in doctoral work with Non-English native tongue

supervisor and dialect sound English, which greatly impeded their ability to build trust and smooth communication. Language problems were not only common with the English language, but also with French, German, Chinese, and Japanese, among others.

Studying in Thailand, students expressed fewer problems with language. It may be because some doctoral thesis in several universities in Thailand was written in Thai.

The results of this study revealed that materials, tools for research, were also problems for the doctoral students. Studying in Thailand, students expressed high problems with materials. The possible explanation is that some specific research instruments are unavailable in Thailand. However, the experienced problems with materials did not predict success or failure in the present study. Despite such problems the participants were successful in gaining their degrees. This finding is similar to those in numerous prior studies (Abiddin & Ismail, 2011; Pyhältö et al., 2012; McAlpine et al., 2009).

Gender equality was an issue consideration in supervision. According to gender combination of doctoral students' gender with supervisors' gender, this study found that male students with female supervisors gave lower proportion of recommendation to further students than others. It might be because male students tend to underestimate female supervisors' professional competence (Bagilhole, 1993; Smeby, 2000). Although the prior study reported that female students faced more difficulties in supervision compared to male students when they had male supervisors (Deem & Brehony, 2000). Female students preferred a same gender supervisor while male

students and male supervisors rated their relationships as better than females (Schroeder & Mynatt, 1993).

This study found that country of doctoral study was a predictor of supervisor score among successful students. Students studying in the US gave higher score for their supervisors. Supervision is a systematic process between student and supervisor, envisaged for the students to achieve their academic, career and personal objectives (Celik, 2013). The relationship between a student and a supervisor could be wonderful and productive. Supervisor requires a great deal of contribution in time and energy on supervision (Ingleby & Chung, 2009; Yeho & Doan, 2012). Supervisor should be knowledgeable and have experienced in research field. Supervisor can also provide useful guide to lead student in the right path way of doctoral journey (Yeho & Doan, 2012).

The qualitative results revealed that students selecting their own research topics and supervisors were more likely to achieve eventual success. It may be because dissertation topic was something that student should find interesting and enjoy thinking about, otherwise they would get tired before they complete their degrees.

Although there was some negativity responses indicated common difficulties during the studies, but these did not necessarily impact achieving the doctoral degree.

Finding of this study suggests to the university policy of increasing the percentage of staff with a doctorate continues then perhaps the university should also focuses on providing consultation and support for male staff and for those studying in the major field of social science. Follow-up while studying may be efficient process for supporting who may be at risk of failure.

4.2 Conclusions

This study surveyed staff members of one public university in Thailand who had enrolled in a doctoral program, whose outcome in terms of degree received or not was already known. Although the responding was relatively small and the response rate not particularly high, the results can impact later doctoral studies. These are a need to encourage staff in the university that will need to improvement in the doctoral completion outcome.

Accordingly, problems that the doctoral students reported should be considered by the university. The solution to the problems may be found in developing the education practices.

4.3 Limitations

This study has some limitations as the data were retrieved from a database which contained only a few factors of interest.

The problem perception while doctoral study was measured using open-ended question, so non-response in this question did not mean that they did not perceive any problems at all.

A further limitation is small response rate that lead to limitation in statistical analysis especially statistical model.

4.4 Recommendation for further study

The factors associated with supervisors' influence, the availability of financial support and whether full-time or part-time study influences the successful completion of a doctoral degree are interesting for further study. Time to complete is also interesting topic to further study.

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Appendix I

Article I: "Demographic and Other Factors Influencing Successful Doctoral

Completion"

SOCIAL SCIENCES & HUMANITIES

Demographic and Other Factors Influencing Successful Doctoral Completion

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ABSTRACT

Doctoral completion rates are of concern to human resources development policy of universities as they endeavour to enhance the academic excellence of their university. The purpose of this study is to investigate the factors influencing doctoral completion success rates amongst staff of a public university in Thailand. The categories of the binary outcome variable, doctoral achievement are successful and unsuccessful or incomplete. The determinant variables include gender, age at the commencement of the doctoral degree, country group of doctoral study and the major or field of doctoral study. Data were obtained from the university's database. Logistic regression was employed to model the effects of multiple determinants on doctorate achievement. The results showed that gender, country of study and field of doctoral study are significant factors leading to successful doctoral completion but age at the commencement of a doctoral degree was not a significant factor. Identification of such factors could be done for other universities so that they can modify their human resources development strategies to support candidates who may be at risk of failure.

Keywords: Doctoral study, successful completion, logistic regression

INTRODUCTION

Research and Development in Thailand has been a major concern of the Thai

government with the particular aim of improving and developing the skills and research capabilities of the personnel involved in teaching and research activities in higher education institutions. These concerns were placed on policies on educational development (Office of the National Education Commission [ONEC], 1997). Furthermore, the National Research University Development project has

launched the policy to develop academic excellence at 9 universities so as to enhance their national competitiveness into world-class university (Office of the Higher Education Commission [OHEC], 2011; Junpeng & Tungkasamit, 2014). Universities have been the major sources of research work and research personnel in developing higher education academic excellence in Thailand, and also generating new bodies of knowledge and technologies appropriate to Thailand's needs (OHEC, 2011). University members have been encouraged to conduct pure and applied research to support the country's goal of self-reliance for continuing social and economic development (Thaima, 2012). Staff having attained doctoral completion is of benefit, not only for a teaching/research institution, but also for the individual staff. University priorities, plans and policies have subsequently been focused on employing staff with doctoral degrees. In fact, the Thai government provides scholarships for university staff to assist them to complete their doctoral degrees both in Thailand and abroad. Not all of them, however, complete these degrees. Doctoral completion rates and times for completion have become a major concern of the Thai national government. Therefore, finding the factors that are related to successful doctoral completions is essential for the success of Thailand's higher education initiative.

Most studies on doctoral completions have concentrated on doctoral students who enrolled in host universities (Seagram,

Gould, & Pyke, 1998; Wright & Cochrane, 2000; Bourke, Holbrokk, Lovat, & Farley, 2004; Visser, Luwel, & Moed, 2007; Wao & Onwuegbuzie, 2011; Wao, 2010; Jiranek, 2010; Bain, Fedynich, & Knight, 2011). In aspects of staff development investment of the host university, the doctoral studying of staff is an interesting issue concerning the host university. However, no previous studies have been carried out on doctoral completion of the host university's staff.

This paper explores demographic factors which influence the successful outcome of the doctoral candidates at one public university in Thailand. The research described in this study focused mainly on quantitative analysis using a statistical method to estimate the rate of doctoral completion considering as the factor variables that are available in the university database. Findings from this study will provide useful information for staff development planning, particularly to postgraduate studies, and assist with forming strategies which may reduce the risks of failure among doctoral candidates.

LITERATURE REVIEW

Doctoral completion is a crucial topic for research in higher education which has become a national issue. The existing literature falls into several main categories; completion rate and time to complete (Lovitts, 2001; Golde, 2005; Rodwell & Neumann, 2008; Visser *et al.*, 2007; Wao, 2010), attrition rates (Nettles & Millett, 2006; Gardner, 2009; Wamala, Ocaya, & Oonyu, 2012), and causes and

consequences of doctoral student attrition (Seagram *et al.*, 1998; Ferrer de Valero, 2001; Visser *et al.*, 2007). These variables have become important indicators of the efficiency and effectiveness of universities and postgraduate student associations (Wright & Cochrane, 2000; Bourke *et al.*, 2004; Visser *et al.*, 2007; Groenvynck, Vandevelde, & Rossem, 2013).

Interest in the issue of doctoral completion has gained considerable momentum in higher education circles over the last few decades. The variation of both attrition and completion rates range by institution and country (e.g., Lovitts, 2001; Martin, Maclachlan, & Karmel, 2001; Elgar, 2003) also reports average completion rates for full-time students ranging from 50 to 60% (Latona & Browne, 2001; Martin *et al.*, 2001; Bourke *et al.*, 2004). Doctoral completion rate in UK was reported to be around 57% of the overall cumulative ten-year (CGS, 2008). Similarly, the completion rate in ten years after the US students began their doctoral programme was 56.6% (Sowell, Zhang, Redd, & King, 2008). In Australia, an average completion rate was around 50% to 60% (Rodwell & Neumann, 2009). Meanwhile, the average completion rate in the Netherlands is around 75% (Van de Schoot, Yerkes, Mouw, & Sonneveld, 2013). Several studies such as those conducted by Lovitts (2001), Golde (2005), and Nettles and Millett (2006) reported varying rates of attrition, i.e. from 11 to 68% across disciplines. Disciplinary attrition rates, however, range greatly with a low

percentage of 24% in the biomedical and behavioural sciences (Pion, 2001) to a high percentage of nearly 67% in the humanities and social sciences (Bowen & Rudenstine, 1992). The estimated projections regarding doctoral attrition range from 40 to 70% (Bowen & Rudenstine, 1992; Bourner, Bowden, & Laing, 2001; Abiddin & Ismail, 2011).

The completion rates also vary by disciplines (e.g., Lovitts, 2001; Martin *et al.*, 2001; Elgar, 2003). The science fields have the best completion rates (Bowen & Rudenstein, 1992; Seagram *et al.*, 1998; Wright & Cochrane, 2000; Martin *et al.*, 2001). A study by the University of California reported that life science and health science had the highest completion rates, with humanities and arts showing the lowest rates (UCOP, 2014). Council of Graduate Schools (CGS) (2008) examined completion rates at the North American Institutions and found the tendency for higher completion rates in the sciences, engineering and mathematics fields.

Many previous studies also reported that time to doctoral completion varied by fields of study. Students in the natural sciences were more likely to complete their doctorate and did so much faster than those in the arts and humanities (Sheridan & Pyke, 1994; Wright & Cochrane, 2000)

Moreover, personal factors play an important role in the time to doctoral completion and they affect completion rates. The known variables regarding the candidates are previous qualification, ethnicity, gender and age (Seagram

et al., 1998; Wright & Cochrane, 2000; Van de Schoot et al., 2013). For example, Mastekaasa (2005) found that Norwegian males had a slightly higher doctoral completion rate and faster time to completion than their female counterparts, while the opposite results showed that women had the length of time taken to earn a doctorate (Maher et al., 2004; Wao, 2010). An earlier study found an unclear gender difference in time to complete the doctoral study (Sheridan & Pyke, 1994; Wilson & Reschly, 1995; Seagram et al., 1998; Wright & Cochrane, 2000; Rodwell & Neumann, 2008), while a study of academic progress of the US doctoral students (Castro, Cavazos, Garcia, & Castro, 2011) found that fewer females completed professional and doctoral degrees than males but that females had higher graduation rates at most preceding levels of education. A study also reported completion rate among difference age group. The age group of 20-26 years at commencement of doctoral study, when compared with older age groups, demonstrated higher completion rates and shorter time to complete their doctorate (Castro et al., 2011) but other studies (see Wright & Cochrane, 2000; Martin et al., 2001; Rodwell & Neumann, 2008) found unclear significance in age difference and time to complete their studies for doctoral students.

In comparison to the western institutions, the body of literature examining completion rate in Thai universities is quite small. Of the few studies that have been published, the majority focusing on undergraduate student drop out (Sittichai, Tongkumchum, & McNeil, 2008; Sittichai, Tongkumchum, & McNeil, 2009; Sittichai, 2012). Lack of database that contains basic information on all students is the main reason and it is also the same concern in other countries (Monsour & Corman, 1991; Bowen & Rudenstine, 1992; Golde, 2005). Moreover, some are written in Thai and thus unavailable to the international research community.

METHODOLOGY

This study was based on a survey of staff who had enrolled for their doctoral studies between 1991 and 2011 in one public university in Thailand. The data were obtained from the database of the university's personnel department. There were 964 staff enrolled in a doctoral degree programme both in Thailand and abroad during the period. Of these, 547 persons had successfully completed their doctorate while 153 did not complete their doctorate. There were 264 persons continuing their studies after 2011, and these were excluded from the analysis because the outcome was still not known. Thus, 700 subjects with known results were selected for this study. Information on gender, age at the point of starting doctoral study, country in which they studied and major or field of doctoral studies was obtained. These four factors were considered as determinants and analysed for their effects on the successful completion of a doctoral degree. Age at the commencement of the doctoral

degree was divided into four groups: under 27 years, 28-31 years, 32-35 years and over 36 years. Meanwhile, the country or region where students studied doctorate was grouped into five regions: Australia and New Zealand, USA and Canada, Europe, Asia, and Thailand. The major, or field of study, was divided into four categories of science, applied science and technology, health science, and social science. The outcome of doctoral completion was binary, successful and unsuccessful or incomplete.

The factors associated with doctoral completion were explored using chi-squared tests, while multivariate analysis was performed using logistic regression to generate the proportions or percentages of expected completions, 95% confidence intervals and p-values. The model formulates the proportion p_{ijk} of this outcome in gender i, country group j, and major of study k as an additive linear function of the determinants, as follows:

$$\ln\left(\frac{p_{ijk}}{1-p_{ijk}}\right) = \mu + a_i + \beta_j + \gamma_k \qquad (1)$$

The model was fitted using sum contrasts (Venables & Ripley, 2002; Tongkumchum & McNeil, 2009). All statistical analyses were performed using the R programme.

RESULTS

Of the 700 persons enrolled in the doctoral study programme, 409 were females and 291 were males, with the average age of 32 years at the start of a doctoral degree and the median duration of study was 4.83 years. The Faculty of Science had the largest number of staff enrolled in a doctoral programme (n=106), while a major in applied science and technology was the most popular field for doctoral study (n=262). The overall successful doctoral completion was 78.1%.

Table 1 shows the proportions and results of the chi-squared tests. The proportion of doctoral completion was substantially higher for female than male staff (83.9% and 70.1%, respectively). The completion rate among those aged 27 years or younger at the commencement of their doctoral study was 83.8%, while the completion rate of age over 36 years was around 10% lower at 73.6%, although this difference is not significant. Meanwhile, the completion rate of those who studying in Europe and in USA or Canada was 88.3%, and 86.7%, respectively, which is significantly higher than those studying elsewhere. Those whose major field of study in science and health science were 83.3%, and 83.9% respectively, but the completion rate in major field of social science was only 66.7%. The low p-values ($\leq$ 0.01) resulting from the chi-squared tests showed that gender, country or region of doctoral study and major or field of doctoral study are significant factors associated with successful completion of doctoral degrees. However, the age at the commencement of starting for a doctoral study was not a significant factor (p-value = 0.156).

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TABLE 1
The Association between Determinants and Doctoral Completion

Factors	Achievement		χ^2	p-value
	Successful	Unsuccessful		
	Number (%)	Number (%)		
Gender			18.8	<0.001
Male	204(70.1)	87(29.9)		
Female	343(83.7)	66(16.1)		
Age at the start of doctoral study			5.2	0.156
≤ 27 years	129(83.8)	25(16.2)		
28-31 years	153(78.1)	43(21.9)		
32-35 years	123(78.3)	34(21.7)		
≥36 years	142(73.6)	51(26.4)		
Country group of doctoral study			32.8	<0.001
Thailand	169(69.3)	75(30.7)		
Australia and New Zealand	49(75.4)	16(24.6)		
Europe	143(88.3)	19(11.7)		
USA and Canada	143(86.7)	22(13.3)		
Asia	43(67.2)	21(32.8)		
Major group of doctoral study			15.7	0.001
Science	80(83.3)	16(16.7)		
Apply science & tech.	232(78.6)	63(21.4)		
Social science	94(66.7)	47(33.3)		
Health science	141(83.9)	27(16.1)		

Fig.1 displays the variability in the completion rates for each category of the determinants. The bar width represents the number of successful doctoral completion and the height represents the observed percentage of doctoral successful. The results from the logistic regression model are displayed using 95% confidence intervals for the percentage of doctoral completions in each category superimposed on the bar chart. The overall doctoral completion rate (78.1%) is shown as the horizontal line and the 95% confidence intervals of the completion rates for each factor after adjusting for other factors are shown as vertical lines. A confidence interval completely above or below, the mean line indicates that factor is significantly higher or lower than expected, after adjusting for other factors. Hence, all the determinants of gender, country or region of doctoral study and major group of doctoral study (with the exception of age) were found to be statistically associated with doctoral completion. Females were more likely to achieve successful completion of doctoral studies than males. Studying in Europe, and USA

and Canada were more likely to end in successful completion whereas the success rates for those studying in Thailand, Australia, New Zealand and Asia were not different from the overall completion rate. Those pursuing doctoral studies in science and health science were more likely to be successful than those pursuing the other major fields.

The results of the logistic regression analysis are in agreement with those found from the chi-squared analyses (see Table 1).
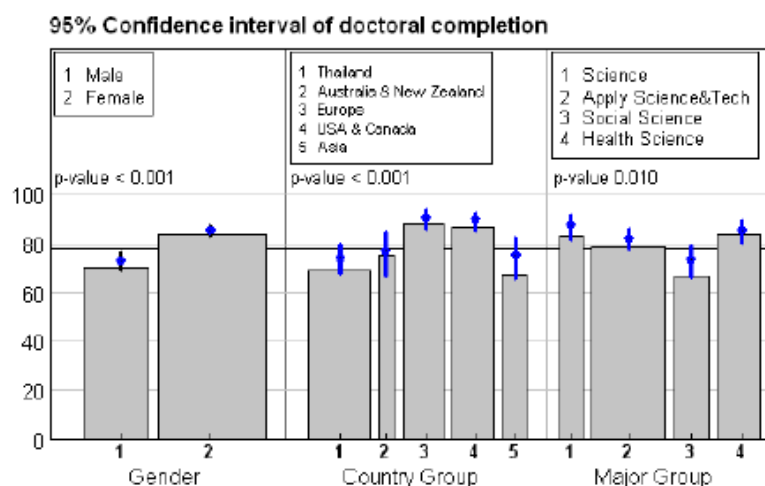

Fig 1: The completion rates for each category of the determinants, with 95% confidence intervals of success rates in doctoral studies.

DISCUSSION AND CONCLUSION

This study has examined factors associated with the achievement of a doctoral degree of the university academic staff. The completion rate of the university's staff was 78.1%. It was difficult to compare the current work with other studies because the subjects in this study were staff from one public university in Thailand.

Females had higher achievement rates than males, both in absolute numbers graduating with doctorate degrees and in the proportions of successful completions after commencement. Female staff at this university outperformed the male staff in doctoral studies. Similarly, the study by Martin *et al.* (2001) reported a higher completion rate among females. This is in contrast to some other findings (see Schroeder & Mynatt, 1993; CGS, 2008). However, Castro *et al.* (2011) reported that females had higher graduation rates at most levels of education in the US, though not at doctoral level. As to whether the gender difference in doctoral studies found in this study is true of the whole country and elsewhere remains to be researched further.

Majoring in science and health science at a doctoral level was a significant

advantage in terms of likelihood to succeed. This finding agrees with a study in Canada which indicates that discipline is important for completion, and that those studying in humanities were less likely to complete than those studying in science (Elgar, 2003), as well as with a study of doctoral completion rate in the UK (Wright & Cochrane, 2000) and a study of doctoral international students studying in the US (CGS, 2008). The reasons could be due to the fact that in natural sciences, the theses are based on the outcomes of specific experiments and/or observed phenomena, while in the social science, the dissertations are often based on the strength of the arguments of certain phenomena. Anecdotal evidence seems to suggest that within the social sciences, the research topics tend to be less specific and this causes difficulties for doctoral students in gaining a clear and definite focus in their research. Heath (2002) claimed that higher doctoral achievements of science, and science and technology students could be due to the specificity of their studies; however, no statistical difference was found between the groups in this study. Studying in Europe, USA and Canada was associated with successful completion of doctoral degrees. It would be interesting to investigate the factors influencing students' choice of study place. Confounding factors such as academic ability or previous academic success might have affected access to scholarships to study in another country or region. Alternatively, those with more significant commitments in addition to their studies, ones that might diminish available study time, might be more reluctant to leave Thailand. Such commitments might include family commitments or the requirement to maintain employment. Further studies could focus on these issues.

The possible advantage in commencing studies at a younger age was not statistically significant in this study. Wright and Cochrane (2000) found that the science doctoral students starting younger age group (20-26 years) demonstrated higher completion rates and shorter times to complete their doctoral degrees but there was no effect in arts and humanities. If the university policy of increasing the percentage of staff with a doctorate continues, then perhaps the university should also focus on providing consultation and support for male staff and those studying in the major field of social science. Studying on part-time basis is another interesting factor that may influence completion rates.

This quantitative study has some limitations as the data were retrieved from a database which contained only a few variables of interest. Hence, a further study is planned to investigate other factors that may influence successful completions of doctoral degree. These included factors associated with supervisors' influence, the availability of financial support and whether full-time or part-time study influences the successful completion of a doctoral degree.

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Appendix II

Impeding Factors in Completing a Doctoral Degree: Analysis of a Survey

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Impeding Factors in Completing a Doctoral Degree: Analysis of a Survey

Abstract

This study aimed to investigate factors associated to success in completing a doctoral program, based on surveying staff members in one public university in Thailand. Initial data were obtained from the university database to select the targeted subjects of a survey. Questionnaires were provided to 700 subjects, focusing on relations with the supervisor and on difficulties experienced during the studies. Logistic regression was used to model the effects of multiple determinants on doctoral achievement, and to assess difficulties in doctoral studies. Linear regression was employed to model the association between such determinants and score assigned to the supervisor. Content analysis was employed to cluster reported types of problems. The results show that country or region of doctoral study was the only factor significant to doctoral achievement. The difficulties in doctoral studies were classified into 8 groups; time, language, materials, research design, money and scholarship, data, supervisor availability, and academic efficiency of the supervisor. These findings provide insights for improving success rates in studies for the doctoral degree.

Key Words: doctoral study, impede completion, logistic regression, linear regression

Introduction

In most countries, the doctoral degree is the pinnacle of education: it is a basic requirement for an academic career, especially in institutions of higher education. The doctoral students' work has a dual nature, as it requires orientation both towards learning by study as well as taking the first steps in independent scientific research

(Golde, 2000; Stubb et al. 2012). Becoming a doctor can be viewed as a highly personal and unique experience (Lahenius & Martinsuo, 2011).

The factors influencing completion of a doctoral degree have been assessed in various host universities over the last few decades (Seagram et al, 1998; Wright & Cochrane, 2000; Rodwell & Neumann, 2008; Bain et al., 2011; Castro et al., 2011; Wao & Onwuegbuzie, 2011). The factors that have been identified in various studies with the completion include gender, age at commencement, and field of study (Seagram et al., 1998; Schroeder & Mynatt, 1999; Heath, 2002; Mastekaasa, 2005; Wao, 2010; Bain et al, 2011), while Bain et al. (2011) suggested that such success depends on self-esteem increased by earlier successes and on the academic care and nurture provided by the supervisor. Difficulties experienced in doctoral programs have been studied widely (Seagram et al., 1998; McAlpine et al., 2009; Abiddin, 2006; Pyhältö et al. 2012).

In these prior studies, the doctoral students' perceptions of typical challenges and problems in the doctoral process were explored in different contexts. The problem with doctoral processes study including generic skills; self-regulation; academic writing; issues related to developing an identity as a researcher (McAlpine et al., 2009; Pyhältö et al., 2012).

The problem with specific expertise related to constructing a theoretical framework; selecting research questions and methods (Seagram et al., 1998; Pyhältö et al., 2012). The study of Seagram et al. (1998) found that in the social sciences there were more difficulties in dissertation topic selection and in conducting research than in the natural sciences. They also reported that women found dissertation topic selection

easier than men. The resources were important to doctoral study progress including problems relating to the lack of funding or other resources; the lack of research instruments (McAlpine et al., 2009; Pyhältö et al., 2012).

McAlpine et al. (2009) also indicated that the Canadian postgraduate perceived difficulty in time issues, such as; lack of time or time management; choosing priorities in the work; slow progress or requiring extended time for completion; paid job and other competing non-PhD commitments; number of tasks or activities; time lost due to other interruptions.

Characteristics of student are also influence to doctoral success such as level of responsibility; level of motivation; negative feelings (disappointment, discouragement, fatigue, frustration, anxiety) and health (Abiddin, 2006; McAlpine et al., 2009).

The important role of the supervisor is to coach, guide and mentor the postgraduate students in research from its design all the way to approved written output (Donald et al., 1995; Wright, 2003; Wadesango & Machingambi, 2011). While the supervisor is responsible for guiding the student, managing the research project is the student's responsibility (Wadesango & Machingambi, 2011). The relationship of a doctoral student with the supervisor is of high interest, for it is among the important key factors affecting doctoral success (Over et al., 1990; Seagram et al. 1998; Schroeder & Mynatt, 1999; Wright, 2003; Wadesango & Machingambi, 2011). The doctoral students' experiences have been studied, including the student's relationship with his or her supervisor; support or lack of it; the supervisor's responsibilities; and

supervisory patterns (Wright, 2003; Abiddin, 2006; McAlpine et al., 2009; Pyhältö et al., 2012)

This current study focuses on the problems that university staff members experienced, not only relating to supervisors, but also regarding time, language, money and scholarship, data materials, and research methods. The outcome assessed in prior studies has usually been time to complete or time to degree (Rodwell & Neumann, 2008; jiranek, 2010; Wao & Onwuegbuzie, 2011).

In contrast, this study aimed to investigate the doctoral degree completion rate, essentially success or failure, in a sample of one public university's staff members. The relationship between supervisor and doctoral student was of high interest. Also, we wanted to identify critical issues of concern to the subjects, in relation to the main problems encountered during their doctoral studies. These findings could have implications for further doctoral students, in their choices and preparation for their studies, benefiting from the experiences and guidelines reported that help avoid or reduce the risk of failure.

Methodology

Sample

The sample used in this study, the respondents to the questionnaire, were staff members who enrolled in a doctoral program in any institution from 1991 to 2011, and were currently employed by a public university in Thailand. They were contracted to serve this university again after completing their doctoral programmes. Altogether, there were 964 staff who had enrolled in doctoral studies. Of these, 547

persons got their degree, 153 persons did not complete, and 264 persons are currently studying. The 264 persons consequently were excluded because their outcomes were not known at time of the survey. Thus, there were 700 subjects included in this study.

A structured questionnaire was established for collecting information on the supervisor's gender, the opinions of the subject regarding the supervisor, recommendations of the same university for others to study, and problems that the doctoral students encountered during their doctoral studies. The questionnaires were sent out to the 700 staff members, with a letter explaining the purpose of the study. Individuals who did not respond were sent another request 3 months later. A total of 316 questionnaires were received as responses.

Data collection

Data on the doctoral completion (success or failure) and demographic factors (gender, country and field of doctoral study) were collected from the university database. The host countries of the doctoral studies were grouped into Thailand, Australasia (Australia and New Zealand), Europe, America and Canada, and other Asia. The fields of study were grouped into four categories namely science, applied science and technology, social sciences, and health sciences.

Another data set was collected using questionnaires. The student–supervisor relationship (How well did your supervisor take care of your PhD work?) was rated on the scale 0-10, where 0 means the supervisor took very poor care of the student, and 10 means the supervisor was of the best kind.

An open-ended item concerned problems that the doctoral candidates encountered during their doctoral studies (What problems did you have during your PhD work?), and this was assessed using content analysis.

Data Analysis

The binary outcomes were doctoral completion, recommendations to further doctoral students, and difficulties while studying. Supervisor-score is a continuous outcome. The determinants considered are gender, country, and field of doctoral study

Logistic regression is used to model the association between a set of determinants and outcome. The model formulates the proportion of this outcome as an additive linear function of the determinants as follows:

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \sum_{i=1}^{k} \beta_i x_i \tag{1}$$

where p is the expected probability of adverse outcome (such as a doctoral completion), β_0 is the intercept, β_i are the regression coefficients, and x_i are explanatory variables.

Linear regression was used to model the relationship between a set of determinants and score for the supervisors' care of the advisee. The model is as follows:

$$y = \beta_0 + \sum_{i=1}^{k} \beta_i x_i \tag{2}$$

where y is the supervisor-score, β_0 is the intercept, β_i are the regression coefficients, and x_i are explanatory variables.

The problems encountered during doctoral studies from the open-ended questions, were grouped using content analysis, into eight groups. Logistic regression as shown in equation (1) was also used to separately model the association between a set of determinants and a problem groups.

All models were fitted using weighted sum contrasts (Venables & Ripley, 2002; Tongkumchum & McNeil, 2009). After fitting the model, the results were shown using confidence interval plots. The difference of each explanatory variable is compared to the overall proportion (mean) by computing 95% confidence intervals. The adjusted proportion (mean) and the confidence intervals are computed. The statistical analysis was performed using R.

Results

The 316 university staff members that responded to the questionnaire represented a 45.1% response rate. Figure 1 displays the ranges of completion rate separately for each category of each determinant assessed. The fitted logistic regression model was used to estimate 95% confidence interval for the percentage of doctoral completions, also shown by the category on the x axis. The overall doctoral completion rate (83.5%) is shown as the horizontal line, and the 95% confidence intervals of completion rates after adjusting for the other factors are shown as vertical lines for each factor level. If the confidence interval is completely above or below the mean line, this indicates that the factor level significantly affected the outcome after adjusting for the other factors. The crude successes rates are shown as blue dots, i.e., these are not adjusted for the bias from other factors in the model, but are subsample summary statistics. Country or region of doctoral study was statistically associated

with doctoral completion, while gender and major group of doctoral study were not significant. Studying in Europe, and USA and Canada were more likely to end in successful completion, whereas for studying in Thailand was less likely to success. However, the completion rate for studies in Australasia or other Asia did not differ from the overall completion rate.
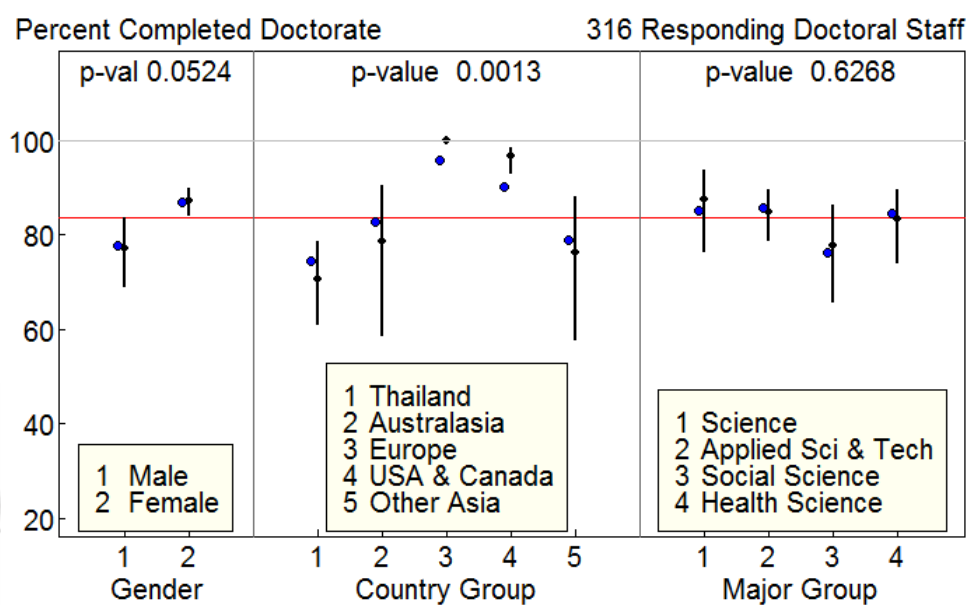

Figure 1 The completion rate for each factor level, with estimated 95% confidence intervals of the success rate in doctoral studies.

Recommendation to further doctoral student

The supervisors' gender and students' gender were combined into female supervisor gender with male student gender and other. It was used as a determinant together with demographic factors. The adjust percentage of recommendation for male student with female supervisor was lower than overall percentage of recommendation.
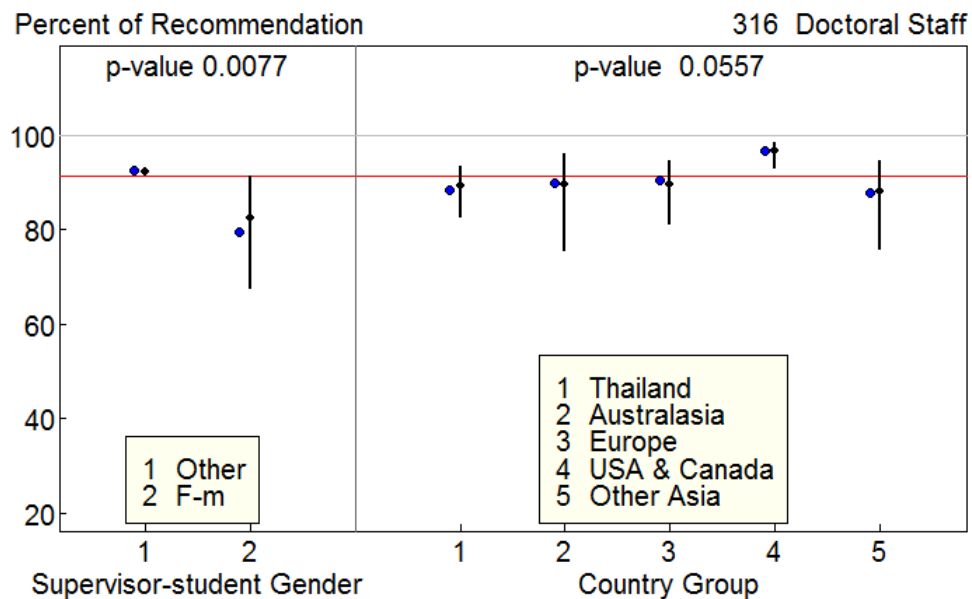
Figure 2 Recommendation to further students shown by relevant factor levels

Satisfaction with supervisor

In Figure 3, the left side shows the satisfaction score of 264 successful doctoral students with their supervisors, whereas the score of the 51 unsuccessful doctoral students with their supervisors is shown on the right.

On the left side, the overall mean satisfaction score with their supervisors was 8.37. Male students with female supervisor tended to have higher satisfaction score than other gender combinations. Country of study was significant among successful students. The adjusted score was higher than overall percentage for studying in USA and Canada.

On the right side, the overall mean satisfaction of supervisors' scores given by the unsuccessful students was 7.64. Male students with female supervisor tended to have lower satisfaction score than other gender combinations. No significant was found.
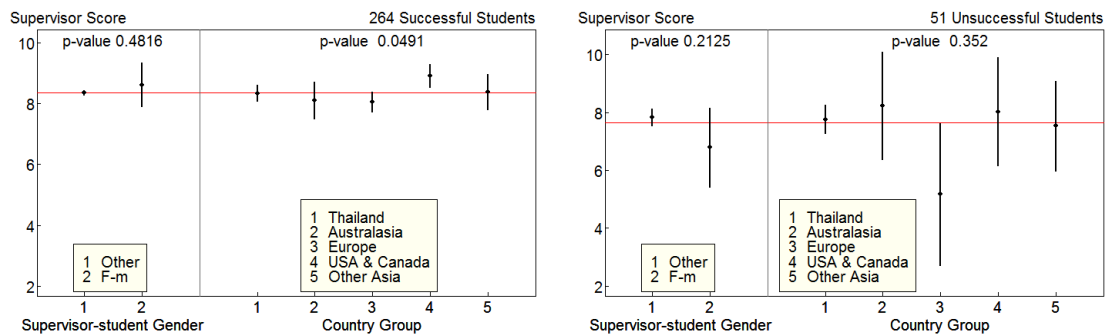
Figure 3 Satisfaction score regarding care provided by the supervisor

Problems

Time

Among 316 staff who responded to the questionnaires, 68 (21.5%) persons mentioned about problems with time while they studied for the doctorate. Females encountered fewer time-related problems than male although, this difference is not significant. Staff members who studied in other Asia were most likely to express concerns about time, significantly exceeding the overall mean, while those who studied in Europe encountered fewer problems with time than the overall percentage.
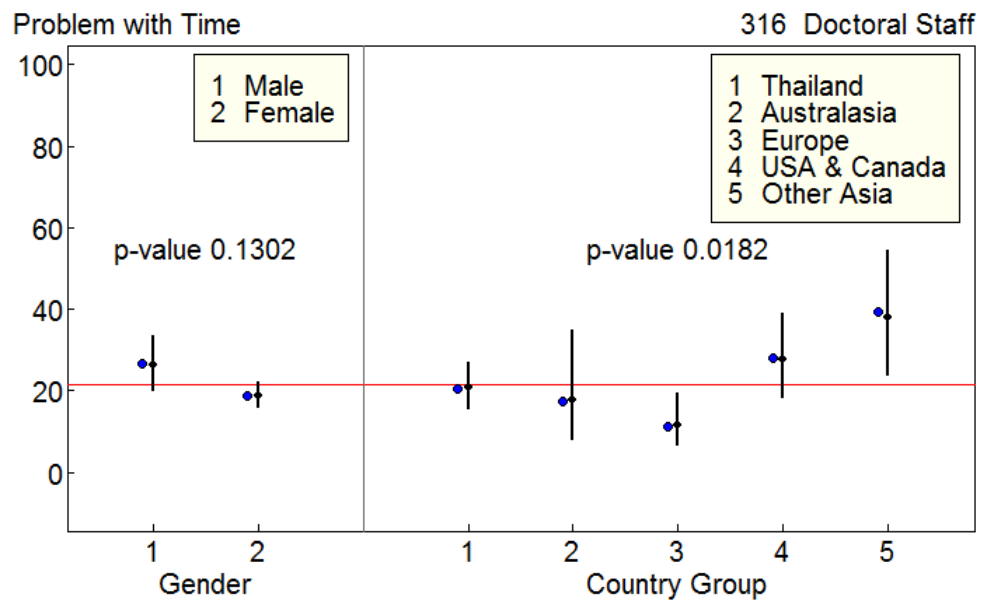
Figure 4 Estimated 95% confidence intervals for problems with time, shown by factor

levels

Language

There is no clear evidence that problems with language impacted success in achieving

the doctorate. There were 70 students (22.2%) who expressed the view that they had

problems with language. Students in Australasia and Europe experienced more

problems with language than the overall mean, but students in the home country,

Thailand, experienced fewer language related-problems than the overall percentage.
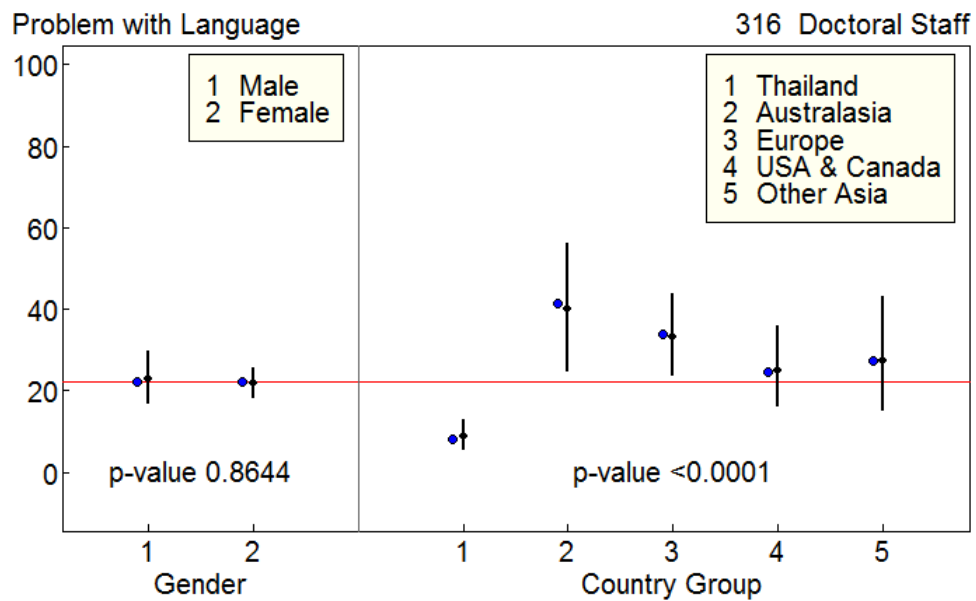
Figure 5 Estimated 95% confidence intervals for problems with language, shown by

factor levels

Materials

There is no doubt that student who studies for a doctorate experience a variety of

common problems. However, 33 (10.4%) persons expressed problems with materials

while they studied for the doctorate. Students in Thailand were more likely to

encounter problems with materials. The frequency of such problems did not differ by

gender. There were problems with using software, and with none or substandard

technical instruments. Many students were engaged in building new instruments or

experimental devices, and access to advanced instruments was limited or prohibitively
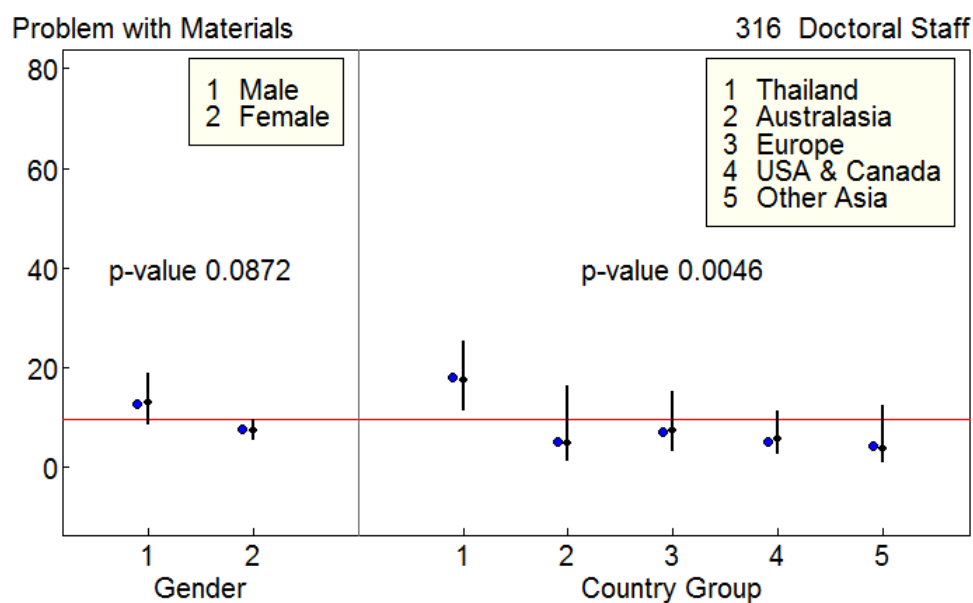
expensive.

Figure 6 Estimates of 95% confidence interval for problems with materials, by factor

levels

Other problems

A small number of respondents expressed concerns about their problems during their

studies. We contrasted studies in Thailand with students elsewhere.

Only 28 students (8.9%) expressed problems with money and scholarship. These

included lacking budget funds, having to pay for downloads, expensive chemicals,

and budget limitations in collecting data. Thirty three (10.4%) students reported

problems with the design of their research. They expressed difficulties with

understanding the content of their research, with writing papers, with new topics, with

original novel work, with lacking examples to follow, or with reviewing literature.

The problem or theme of research was highlighted as a source of difficulties. Students

carrying out qualitative studies experienced difficulties with collecting data.

There were 34 students (10.8%) who claimed they lacked data to study. They reported difficulties with finding data, lack of literature, incorrect data, no good teamwork in collecting data, no expertise in the field, faulty specimens, difficulties with finding specimens, data that was not up-to-date, inability to collect data, and incomplete data.

The problems attributed to the supervisor fell into two groups, namely students thought their supervisor was too busy, or they doubted the academic efficiency of the supervisor. Thirty students (9.5%) expressing problems relating to the supervisor was too busy, having no time to advise and support them. Often the supervisor had too many students, and it was hard to find time for thesis supervision.

In 39 cases (12.3%) the academic efficiency of the supervisors was considered poor. These cases included supervisors who were not experts in the field of study, or who provided unclear and inconsistent advice and suggestions.
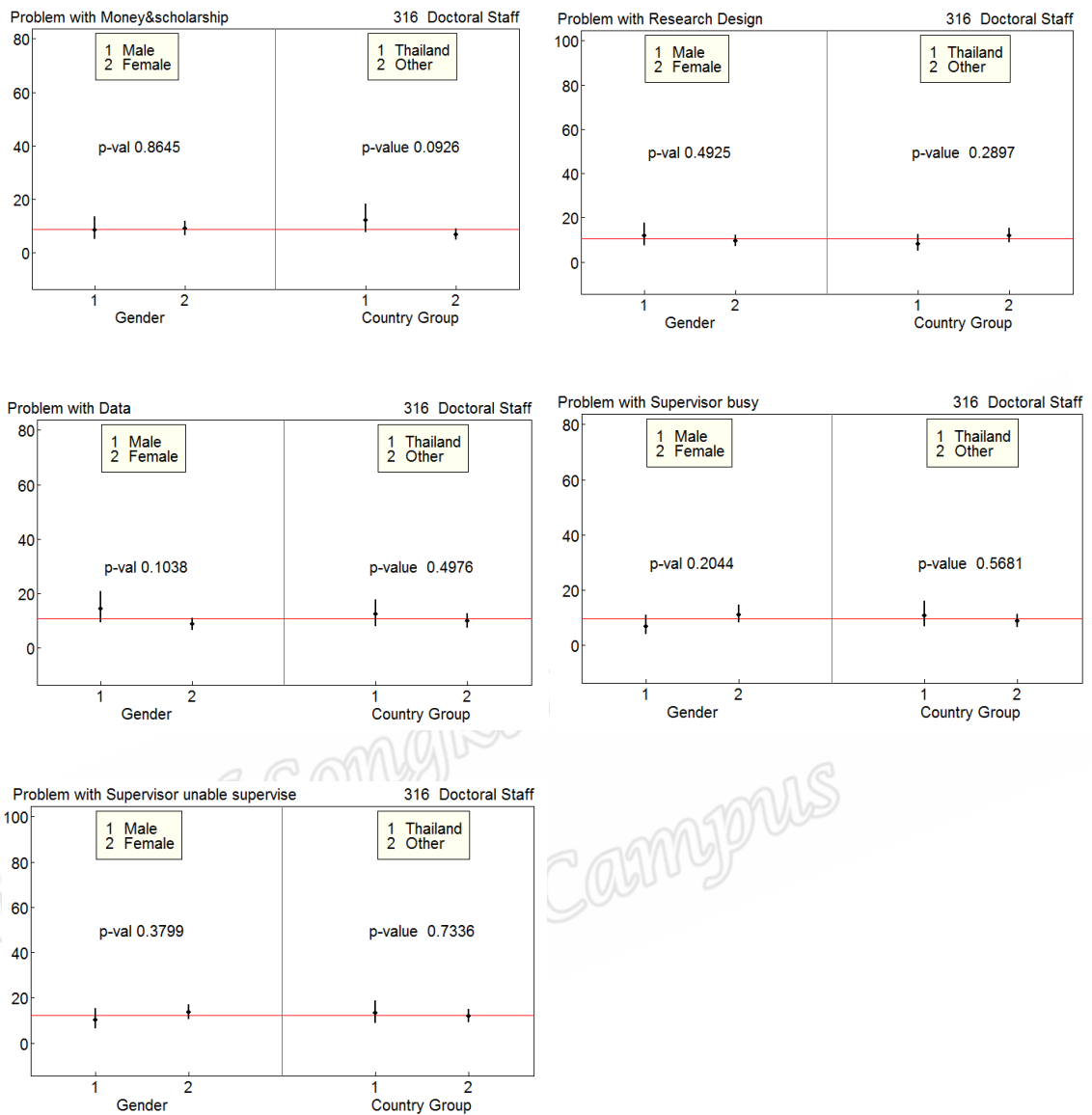
Figure 7 Estimated 95% confidence intervals for frequencies of other problems

reported in the survey

Discussion

The findings from this study show that the country of doctoral study was found to be

associated with doctoral achievement. The questionnaire responses about problems

the university staff had encountered during their studies for doctoral degree fell into 8

categories. Although the sampling was relatively small and the response rate not

particularly high, the results can impact later doctoral studies. Many responses indicated common difficulties during the studies, but these did not necessarily impact achieving the doctoral degree. The supervisors' score given by their doctoral students was not associated with success in achieving the degree. In Thailand problems regarding time were common, but this might refer also part-time studies, which could be addressed in a further study. The problems experienced with materials did not predict success or failure. Often, despite such problems the subjects were successful in gaining their degrees. This finding is similar to those in several prior studies (McAlpine et al., 2009; Abiddin & Ismail, 2011; Pyhältö et al., 2012).

Many students expressed the view that they had problems with the study language. Language was occasionally a problem also for students who stayed in their native Thailand for studies, because English was used to communicate, and to write papers and theses, especially in an international program. Similar to international students who studied abroad, English language skills such as writing ability, understanding and speaking English adequately were a source of stress (Wan et al., 1992; Adrian-Taylor et al., 2007). English language is the dominant international language in Thailand, but Thai people communicate by using Thai language in their daily lives, so their proficiency in English is not necessarily well developed. Language problems were not only common with the English language, but also with French, German, Chinese, and Japanese, among others. Thai students lacked confidence in their mastery of appropriate academic language, or in reaching proper standards in the native language (Wang & Li, 2008). Time issues were a frequent category of problems for the doctoral students. This finding agrees with McAlpine et al. (2009). Frequently the students did

not get enough time with their supervisors, because they were too busy to be effective in their advisory roles for having too many other students to supervise, for heavy classroom lecture obligations, and for various meetings: this agrees with the study by Wadesango & Machingambi (2011). Most students in this study were satisfied with the care given by the supervisors, similar to the Australian PhD candidates in the study by Heath (2002).

The most frequently cited cause for delays in completing the doctoral studies was the lack of adequate mentoring or advising (Valero, 2001; Abiddin & Ismail, 2011). Students indicated that supervisors had too many other students to supervise or to attend, heavy lecturing obligations as well as attending to administrative obligations (Wadesango & Machingambi, 2011).

Conclusions

This study surveyed staff members of one university who had enrolled in a doctoral program, whose outcome in terms of degree received or not was already known. The subjects in this study were in general confident in their abilities to deal with difficulties. Accessibility of the advisor, who is typically professionally active and perhaps overburdened, was perceived as a frequent key problem during the studies. A limitation of a survey study like this, especially due the low response rate is that types of problems that were not reported might still exist.

Acknowledgments

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10.1080/713696139

Appendix III

Proceeding: "Supervisor-Student Relationship Effect to Doctoral Completion"

Conference Proceedings

February 7-9, 2017
Seoul, Korea

SICSSAM

Seoul International Conference on Social Sciences and Management

APCESP

Asia-Pacific Conference on Education, Society and Psychology

Education (4)

Thursday, February 9, 2017   13:00-14:30   Room 1

Session Chair: *Prof. Judith Salvador Calamayo*

SICSSAM-1326

Performance of Teacher Education Students in Demonstration Teaching in the College of Education for SY 2010 – 2011 to 2013 – 2014

Judith Salvador Calamayo | *Northwest Samar State University*

Helen Serrato Cabral | *Northwest Samar State University*

Wilfredo Almazar Aurea | *Northwest Samar State University*

Maria Lucil Hibaya Dollado | *Northwest Samar State University*

Peter Anthony Cui Petilla | *Northwest Samar State University*

Ma. Cleta A Santos | *Northwest Samar State University*

Perpetuo Cano Epilogo | *Northwest Samar State University*

Bella Balon Delos Reyes | *Northwest Samar State University*

Modesto Maloloy-On Maniable | *Northwest Samar State University*

SICSSAM-1260

Comparing and Validating the Concepts of Service Personal Values and Service Value from the Customer's Perspective in Higher Education

Wan Salmuni Wan Mustaffa | *Universiti Pendidikan Sultan Idris*

Rafiduraida Abdul Rahman | *Universiti Pendidikan Sultan Idris*

Suraini Mohd Rhouse | *Universiti Pendidikan Sultan Idris*

Hariyaty Ab Wahid | *Universiti Pendidikan Sultan Idris*

SICSSAM-1517

Supervisor-Student Relationship Effect to Doctoral Completion

Montri Watthanapradith | *Prince of Songkla University, Pattani Campus*

Phattrawan Tongkumchum | *Prince of Songkla University, Pattani Campus*

SICSSAM-1544

The Influence of Exercise Bosu Single Leg Balance and Bosu Lateral Lunges with Single Leg Balance to Balance and Agility

Nanik Indahwati | *State University of Surabaya*

Nurhasan | *State University of Surabaya*

Lucy Wydia Fathir | *State University of Surabaya*

SICSSAM-1517
Supervisor-Student Relationship Effect to Doctoral Completion

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Faculty of Science and Technology, Prince of Songkla University, Pattani Campus, Thailand
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Abstract
This study aims to investigate relationship of supervisor and student effecting to doctoral completion rate among doctoral students in one public university of Thailand. Gender difference of supervisor and doctoral student and country or region of study was determinants associated with doctoral completion. Demographic database were obtained from the university. A structured questionnaire 700 subjects and among them, 316 subjects responded (45.1%). Statistical analysis used Chi-squared test to assess statistically factors for doctoral achievement. Logistic regression model were used to identify effects of determinants for doctoral achievement. Doctoral achievement found to be higher among with female students with female supervisors and students studying aboard. The multivariate logistic analysis revealed that doctoral completion was higher among with female students with female supervisors and subjects studying aboard. Identification of such factors may be useful to universities s to support candidates who may higher risk of failure.

Keywords: Doctoral study, successful completion, logistic regression, Thailand

Introduction
Doctoral degree is the highest goal of student because of becoming a doctor can be viewed as a highly personal and unique experience (Lahenius & Martinsuo, 2011). Most of universities concerned that candidates in research higher degree programs complete their studies in time (Green & Usher, 2003). Many previous studies report that less than a half of all students enrolled doctoral programs achieve their degree (Frischer & Larsson, 2000; Green, 2005; Kiley & Mullins, 2005). The UK students fail to doctoral completion in social science dissertation between 40% and 50% (Armstrong, 2004, Araque et al., 2009) similar to 50% of students in North America dropped out before doctoral graduation (National Center for Education Statistics, 2000).

There are demographic predictors variables associated with research supervision, supervisors, students themselves and their expectations (Rodwell & Neumann, 2008). These are also important determinants of the time taken to complete the degree (Brown & Watson, 2010; Winchester-Seeto, et al., 2014) including previous qualification, ethnicity, gender and age (Van de Schoot et al., 2013; Wright & Cochrane, 2000; Seagram et al., 1998, Araque, et al., 2009).

For example, Mastekaasa (2005) found that Norwegian males had a slightly higher doctoral completion rate and faster time to completion than their female counterparts while Watthanapradith et al. (2016) reported differences in completion rates of Thai female had a higher completion rate than male. A previous study found imprecise gender difference in time to complete the doctoral study (Seagram et al., 1998; Wright & Cochrane, 2000; Rodwell & Neumann, 2008).

Most of researchers also agree that doctoral completion is depends on close and working relationship of students and their supervisors (Krauss & Ismail, 2010). The relationship of students and their supervisor is the important factor to the doctoral successful that associated with students' progress and satisfaction with their doctoral studies. (Ives & Rowley, 2005; Sambrook, et al., 2008; Zhao, et al. 2007). Research supervision plays a key role in training, empowering and facilitating doctoral students to become independent scholars. Supervisors are important for students' professional opportunities, and may help them getting work published and accessing professional networks (Smeby, 2000). Gender of doctoral student and supervisor is concerned to degree completion and publication. Norwegian universities show that there is a significant same-gender tendency in graduate supervisory relationships, and that this tendency is stronger among women than among men (Smeby, 2000). Studies suggest that female students with female supervisors are more satisfied with their supervisors than female students with male supervisors (Schroeder & Mynatt 1993).

According to increasingly number of doctoral student, Western education is the top destination from developing country and for whom English is not their first language (Mahroum, 2005; Wang & Li, 2008). Personal adaptation and cross culture was concerned in many universities to improve supervision for international student (Wan, et al., 1992; Smith & Khawaja, 2011). This study aims to investigate doctoral completion of Thai students with gender, supervisors and country of region of study.

Method

This study was based on a survey of PhD staffs who had enrolled for doctoral study in one public university in Thailand and aboard from 1991 to 2011. Data were obtained from the database of university's department. There were 964 staff enrolled in a doctoral degree program both in Thailand and abroad during the particular period. Of these, 547 persons had successfully completed their doctorate while 153 did not complete their doctorate. There were 264 persons continuing their study after 2011, and these were excluded from the analysis because their outcome was still not known. The structure questionnaires were distributed to 700 subjects and 316 were returned. The overall response rate was about 45.14%. Information on supervisors' gender and students' gender were grouped into different gender and the same gender as one of two determinants. The number of male student with male supervisor

relationships (m-M), female student with male supervisor relationships (f-M), male student with female supervisor relationships (m-F) and female student with female supervisor relationships (f-F) is calculated for determinant. The country or region of a student's doctoral study was grouped into 2 regions, Thailand and abroad or other. The outcome of doctoral completion was binary: successful and unsuccessful or incomplete.

Statistical Analysis

Chi-squared tests was employed to test the association between determinant with doctoral completion. A multivariate logistic regression model was used to estimate the proportion p_{ij} of this outcome, in combination gender i and country group j. The model is of the form:

$$ln\left(\frac{p_{ij}}{1-p}\right) = \mu + a_i + \beta_j \tag{1}$$

This model also gives confidence intervals for levels of each risk factor adjusted for other risk factors using sum contrasts methods. The confidence intervals based on sum contrasts has an advantage that they provide a simple criterion for classifying levels of the factor into three groups according to whether each corresponding confidence interval exceeds, crosses, or is below the overall percent. The confidence intervals compared percent of the specified cause group in each category with the overall percent. All statistical analyses were performed using the R program.

Result

Of the 316 subjects who enrolled doctoral program, there were 199 females and 117 males. Of these, 264 gained their degrees but 52 could not complete. The completion rate is 83.5%. In the successful group, there were 91 males and 173 female but in the counterpart there were 26 males and female respectively. Gender combination of doctoral students and their supervisors showed that, 170 (53.8%) were the same gender of students and their supervisors, of these, 90 (28.5%) are male students and 80 (25.3%) are female students. In the counterpart, 146 (46.2%) were different gender form their supervisor, 27 (8.5%) are male students and 119 (31.7%) are female students.

There were 122 persons who studied in Thailand and 194 studied abroad (38.6% and 61.4% respectively).

Table 1 depicts the association between gender combination and country or region with doctoral achievement. Combination of student's gender and supervisors and country group or region of doctoral study was associated with successful doctoral completion. Highest doctoral completion was found in same gender of students and supervisors (88.7%) whereas lowest doctoral completion was found when students were males and supervisors were female (66.7%).

Table 1: Association between determinants and doctoral completion

Factors	Achievement		χ^2	p-value
	Successful No (%)	Unsuccessful No (%)		
Combination Gender			7.967	0.046
male-Male	73 (81.1)	17 (18.9)		
female-Male	102 (85.7)	17 (14.3)		
male-Female	18(66.7)	9 (33.3)		
female-Female	71(88.7)	9(11.3)		
Country group of doctoral study			11.58	<0.001
Thailand	91(74.6)	31(25.4)		
Other	173(89.2)	21(10.8)		

Studying abroad was most likely to complete their degree than studying in Thailand, the completion rate were 89.2%, and 74.6% respectively.
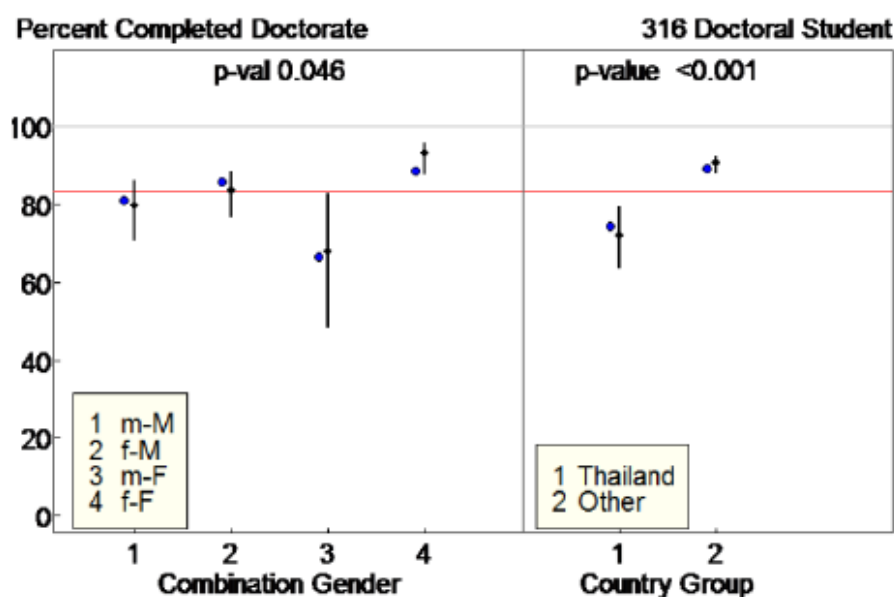

Figure 1: The completion rates for each category of the determinants together with 95% confidence intervals of success rates in doctoral studies.

Figure 1 displays the results of fitting multivariate logistic regression of completion rate separately for each category of each determinant. Results from logistic regression model were displayed using 95% confidence interval for the percentage of doctoral completion plot. It was shown the variability in the completion rates for each category of the determinants. The overall percentage of doctoral completion rate is shown as the horizontal line was 83.5%. There was

significant association of gender combination and doctoral completion (p-value =0.046). Female students with female supervisors were more likely to successful completion. In contrast, male students with female supervisors were less likely to successful completion. Country or region of doctoral study was statistically associated with doctoral completion. Studying abroad was more likely to successful completion than studying in Thailand.

Discussion and Conclusion

This study investigated gender of doctoral students and their supervisors and country or region of study that associate with the achievement of a doctoral degree of the university academic staff. The completion rate of the university's staff was 83.5%.

Female students with the same gender of their supervisors had higher associate to completion than male in bivariate analysis. These findings of this study were consistent with findings in the research literature that female students prefer and more satisfied with same-gender supervisors and need female role models (Smeby, 2000). Female supervisors understand that female students are concerned about better than male counterparts. Male students with female supervisors had lower completion. However, male students with female supervisors did not articulate any similar dislikes of their relationships with their female supervisors (Schroeder & Mynatt, 1993). The study also found that subjects studying aboard had higher completion rate than subject studying in Thailand.

A further study is planned to investigate other factors that may influence successful completions of doctoral degree. These included factors associated with supervisors' influence, the availability of financial support and whether full-time or part-time study influences the successful completion of a doctoral degree.

Acknowledgments

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Has attended the conference and presented a paper entitled

Supervisor-Student Relationship Effect to Doctoral Completion

Chief Executive Committee

SICSSAM-1517

Appendix IV

Questionnaire about Doctoral study of Staff

between 1991-2011

Direction

Please fill **in** the form completely

Personal Background

1. Gender [ ] Male [ ] Female

2. PhD Study

Education ⸻

Field of Study ⸻

University/Institute ⸻

Country ⸻

Supervisor Background and PhD Work

1. Gender of your supervisor [ ] Male [ ] Female

2. How well did your supervisor take care for your PhD work?

Best   **Poor**

10	9	8	7	6	5	4	3	2	1	0

3. Did your PhD work result in any publication?

[ ] yes

[ ] no

[ ] not sure

4. What problems did you have during your PhD work?

⸻

⸻

⸻

5. Would you recommend the University program where you studied for your PhD to potential students?

[ ] yes

[ ] no

Vitae

Name: Mr. Montri Watthanapradith

Student ID: 5420330011

Educational Attainment:

Degree	Name of institution	Year of Graduation
B.A. (Thai, English)	Phranakhon Si Ayutthaya Rajabhat University	1987
M.Ed. (Educational Administration)	Prince of Songkla University	1999

Scholarship Award during Enrolment

- Scholarship from Prince of Songkla University, Pattani campus, Thailand

- Research Scholarship from Graduate school, Prince of Songkla University, Pattani campus, Thailand

- Scholarship for visiting at University of Malaya in Malaysia from the Faculty of Science and Technology, Prince of Songkla University, Pattani campus, Thailand

- Scholarship for International Conference from the Graduate school and Faculty of Science and Technology, Prince of Songkla University, Pattani campus, Thailand

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