Faculty of Computer Science and Information Technology

MODELLING FYP STUDENT SELECTION

(SUPERVISOR PERSPECTIVE)

Teo Kia Jian

Bachelor of Computer Science with Honours (Multimedia Computing)

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UNIVERSITI MALAYSIA SARAWAK

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MODELLING FYP STUDENT SELECTION

(SUPERVISOR PERSPECTIVE)

TEO KIA JIAN

This project is submitted in fulfilment of the
requirements for the Final Year Project of the degree of
Bachelor of Computer Science with Honours

Faculty of Computer Science and information Technology
UNIVERSITI MALAYSIA SARAWAK
2019

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Signed,

………………………………………….

TEO KIA JIAN

Faculty of Computer Science and Information Technology   14 MAY 2019

Universiti Malaysia Sarawak.

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Next, I would like to show my appreciation for the friends for their helps. I am thankful to them as they are willing to sacrifice their time to have discussion and some opinions on my Final Year Project.

Last but not least, I would like to thank my beloved family for their encouragement and endless motivation for me throughout this Final Year Project.

ABSTRACT

Final Year Project (FYP) of Faculty of Computer Science and Information Technology (FCSIT) in University Malaysia Sarawak (UNIMAS) will be taken by a final year undergraduate. It is a one-year project that requires students to select a supervisor to do their project under his/ her supervision. This course requires the students to apply their knowledge to a specific topic and the project need to be completed within twelve months. Since it is a long term project, the cooperation between the supervisor and the undergraduate is very important. A supervisor may have a number of students under his/ her supervision. But each supervisor from different field would have their own set of rule-of-thumb in agreeing to be supervising FYP students. This results the wasting of time for both lecturers and undergraduates if the project they plan to do is not match their personal requirements, and delay the conduction of the FYP. This study aims to collect the data from different field of experts in FCSIT about the factors that affect their decision in accepting undergraduates to be supervising FYP and analyse the data using statistical analysis which is EFA to identify the factors that affecting their decision. CFA is used to test and evaluate the statistical model produced.

ABSTRAK

Projek Tahun Akhir (FYP) Fakulti Sains Komputer dan Teknologi Maklumat (FCSIT) di Universiti Malaysia Sarawak (UNIMAS) akan diambil oleh pelajar akhir tahun. Projek ini adalah satu tahun projek yang memerlukan pelajar memilih penyelia untuk melakukan projek mereka di bawah pengawasannya. Kursus ini memerlukan pelajar untuk menggunakan pengetahuan mereka untuk topik tertentu dan projek itu perlu diselesaikan dalam tempoh dua belas bulan. Oleh sebab ini merupakan projek jangka panjang, kerjasama antara penyelia dan sarjana itu sangat penting. Penyelia mungkin mempunyai sejumlah pelajar di bawah pengawasannya. Tetapi setiap penyelia dari bidang yang berbeza akan mempunyai peraturan mereka sendiri untuk bersetuju untuk mengawasi para pelajar FYP. Hal ini mengakibatkan membuang masa bagi kedua-dua pensyarah dan mahasiswa jika projek yang mereka merancang untuk dilakukan tidak sepadan dengan keperluan peribadi mereka, dan menunda pengalihan FYP. Kajian ini bertujuan untuk mengumpul data dari pelbagai pakar di FCSIT mengenai faktor-faktor yang mempengaruhi keputusan mereka dalam menerima mahasiswa supaya mengawasi FYP dan menganalisis data menggunakan analisis statistik yang mana EFA mengenal pasti faktor-faktor yang mempengaruhi keputusan mereka. CFA digunakan untuk menguji dan menilai model statistik yang dihasilkan.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

The conduction of the Final Year Project (FYP) is held on every year for the 4th year students of Faulty of Computer Science and Technology (FCSIT). However, the selection of the FYP students by the supervisors in FCSIT will normally take 3 weeks or more. This will subsequently delay the conduction of FYP since both students and supervisors would select a suitable topic of FYP which both sides are interested in. The lack of effectiveness in choosing the FYP students by the supervisors happened every year. This is mainly because, from supervisor(s) perspective, the supervisors may have their own rule-of thumbs in choosing the FYP students. Many aspects may take into consideration of the supervisors in selecting the FYP students such as the major of the programme which the students belong to, the company where the students went for their industrial training, or the attitude of the students and so on.

For any design and modelling purpose, the ultimate aim is to gain sufficient insight into the system of interest so as to provide accurate predictions and better designs (Xin-She Yang, 2013). To address this situation, basically this project will aim to gain insight on the factors that the supervisors will choose their FYP students by providing a conceptual model using statistical analysis. This project will require to collect the data from supervisors concerning aspects consideration to accept a FYP student. After that, the data collected will undergo statistical analysis to analyse and identify the factors that affecting their decision using Exploratory Factor Analysis (EFA). The result will be a model with identified factors that affecting the supervisors in taking FYP students thus giving a reference for the students to preview when choosing the supervisor for their FYP. It helps undergraduates to save the time in finding a suitable supervisor and for supervisor to find an acceptable FYP student. Thus, this research helps to smooth the conduction of FYP.

1.2   Problem Statement

Final Year Project (FYP) of Faculty of Computer Science and Information Technology (FCSIT) in University Malaysia Sarawak (UNIMAS) will be taken by a final year undergraduate. It is a one-year project that requires students to select a supervisor to do their project under supervision. This course requires the students to apply their knowledge to a specific topic and the project need to be completed within twelve months. Since it is a long term project, the cooperation between the supervisor and the undergraduate is very important. A supervisor may have a number of students under the supervision. But each supervisor from different field would have their own set of rule-of-thumb in agreeing to be supervising FYP students. It is time-consuming for both lecturers and undergraduates if the project they plan to do is not match their personal requirements, and delay the conduction of the FYP.

As resources are limited, to minimize the cost and energy consumption, and to maximize the performance, profits and efficiency can be crucially important in all designs (Xin-She Yang, 2013). There is not research found matching or similar to this topic. The only result that can be found is "FCSIT FYP Database" by the faculty which only provides the list of FYP topic done by the previous undergraduates. There is no information on classification of the reasons on the selection of FYP students by the supervisors. In this study, statistical analysis will be used to create a model and to analyse the factors that affect the selection of the FYP students by the supervisors. It provides a statistical model which helps to visualise the factors that affecting the supervisors in every year FYP conduction.

1.3 Scope

In this study, the data collection is mainly from the lecturers of FCSIT that becoming a supervisor to a FYP student. This aims to collect the data from different field of experts in FCSIT about the factors that affect their decision in accepting to be supervisor for undergraduate in FYP and analyse the data using statistical analysis and to identify the factors that affecting their decision. This specific statistical model will provide insight on how the supervisors make the decision on selecting the FYP students.

1.4 Objectives

Three main objectives are defined in order to achieve the modelling of student selection for FYP course:

- ➢ To collect the data from FCSIT supervisor(s) concerning their own rule-of-thumb in agreeing to be supervising FYP student(s).
- ➢ To model, analyse and identify the factor(s) that affect supervisor's decision in agreeing to be supervisor for the FYP student(s).
- ➢ To test and evaluate the model.

1.5 Brief Methodology

Methodology tells and convince the readers how the project is carried out and make a clear understanding about the tasks carried out in the project. It also helps to identify the resources needed in the project. it is basically included the population and sampling procedure and benchmarking, measuring instruments to be used, the procedure and the time frame of data collection and the way to analyse the collected data.

1.5.1 Research Design

This research is going to be conducted using a quantitative approach in investigate the factors that affecting the supervisors in selection of the FYP students. The data collected will undergo an analysis using statistical analysis to model, analyse and identify the factors that affect supervisors' decision in agreeing to be supervisor for the FYP students.

1.5.2 Participants

The analysis requires the data to be collected from the lecturers of FCSIT from different major of the programmes which are Computational Science (CS), Information System (IS), Multimedia Computing (MC), Software Engineering (SE) and Network Computing (NC). To collect as much as data as possible, a Google Form questionnaire form will be sent to every email of the lecturers in FCSIT to ask for the participation of this research.

1.5.3 Questionnaire Design

The questionnaire will be designed based on the review of the research papers. The questionnaire will be designed to discover the factors that affect the lecturers' selection on their FYP students. A Likert-scale questionnaire will be designed to test on the degree of agreement with the statement containing in the questionnaire.

1.5.4 Data Collection

The quantitative data collection includes the questionnaire which is designed for the FCSIT lecturers on the various factors. The questionnaire will be conducted using Google Form and the data collected will be stored in Google Sheet.

1.5.5 Data Analysis

Right after the data is collected, a Factor Analysis (FA) using technique Exploratory Factor Analysis (EFA) will be carried out. Factor Analysis consists of a collection of procedures for analysing the relations among a set of random variables observed or counted or measured for each individual of a group (Cureton, 1902). Factor Analysis (FA) is a statistical procedure that involves the relationship between observed variables (measurement) and the underlying latent factors. The application of EFA will largely determine the types of other techniques which a data analyst can use to examine a given set of data. (Frederick Hartwig, 1979). Therefore, the data collected using the web form will be analyse using R-studio (will be discussed further in Chapter 3) to model and analyse to identify the factors that affect the selection of the supervisor in FYP conduction. The emphasis of EFA is upon using visual displays to reveal vital information about the data being examined.

1.6 Significance of Project

This project is exploring the possible factors that contribute to the supervisors' decisions in accepting students for FYP subject. This allowing the faculty to refer to the statistical model produced that enable them to have a glance on the supervisor's selection. Furthermore, it helps to fasten the conduction of the Final Year Project without delaying.

1.7 Project Schedule

Figure 1.1 shows the schedule of the project carried out.

❶	Task Mode	Task Name	Duration	Start	Finish
	⚲	**◢ Modelling FYP student selection (supervisor perspective)**	**171 days**	**Mon 24/9/18**	**Mon 20/5/19**
	⚲	**◢ Brief Proposal**	**6 days**	**Mon 24/9/18**	**Sat 29/9/18**
▦	➥	Preparing brief proposal	2 days	Mon 24/9/18	Tue 25/9/18
▦	➥	Submit breif proposal to supervisor for checking	1 day	Wed 26/9/18	Wed 26/9/18
▦	➥	Refine and finalize brief proposal	1 day	Thu 27/9/18	Thu 27/9/18
	➥	Submission	1 day	Fri 28/9/18	Fri 28/9/18
	⚲	**◢ Full Proposal**	**56 days**	**Mon 1/10/18**	**Sat 15/12/18**
	⚲	**◢ Chapter 1: Introduction**	**20 days**	**Mon 1/10/18**	**Fri 26/10/18**
	⚲	Identify problem statement	5 days	Mon 1/10/18	Fri 5/10/18
	⚲	Identify the scope	5 days	Mon 8/10/18	Fri 12/10/18
▦	➥	Identify the objectives	5 days	Mon 15/10/18	Fri 19/10/18
	⚲	Identify brief methodology	3 days	Mon 22/10/18	Wed 24/10/18
	⚲	Identify significant of project	2 days	Thu 25/10/18	Fri 26/10/18
	⚲	**◢ Chapter 2: Literature Review**	**15 days**	**Mon 29/10/18**	**Fri 16/11/18**
	⚲	Review on existing work	5 days	Mon 29/10/18	Fri 2/11/18
	⚲	Review on statistical analysis	5 days	Mon 5/11/18	Fri 9/11/18
▦	➥	Review on modelling tool	5 days	Mon 12/11/18	Fri 16/11/18
	⚲	**◢ Chapter 3: Methodology**	**15 days**	**Mon 19/11/18**	**Fri 7/12/18**
	⚲	Participant	2 days	Mon 19/11/18	Tue 20/11/18
	⚲	Questionnaire design	4 days	Wed 21/11/18	Mon 26/11/18
▦	➥	Data Collection	5 days	Tue 27/11/18	Mon 3/12/18
	⚲	Data Analysis	2 days	Tue 4/12/18	Wed 5/12/18
	⚲	Identify software and hardware requirement	2 days	Thu 6/12/18	Fri 7/12/18
	⚲	**◢ FYP Final Report**	**10 days**	**Mon 10/12/18**	**Fri 21/12/18**
▦	➥	Refine and finalize final report	4 days	Mon 10/12/18	Thu 13/12/18
▦	➥	Submission	1 day	Fri 14/12/18	Fri 14/12/18
▦	➥	Preparation for presentation slide	3 days	Mon 17/12/18	Wed 19/12/18
▦	➥	FYP 1 Sympossium Presentation	2 days	Thu 20/12/18	Fri 21/12/18
	⚲	**◢ FYP 1 Report Amendment**	**15 days**	**Mon 24/12/18**	**Fri 11/1/19**
	➥	Discussion with supervisor	1 day	Mon 24/12/18	Mon 24/12/18
	⚲	Refine FYP1	13 days	Tue 25/12/18	Thu 10/1/19
▦	➥	Submission	1 day	Fri 11/1/19	Fri 11/1/19
	⚲	**◢ Chapter 4: Results and Analysis**	**50 days**	**Mon 14/1/19**	**Fri 22/3/19**
	⚲	Implementation	10 days	Mon 14/1/19	Fri 25/1/19
	⚲	Result on modelling	10 days	Mon 28/1/19	Fri 8/2/19
	⚲	Testing and evaluation	10 days	Mon 11/2/19	Fri 22/2/19
	⚲	Project Writeup	10 days	Mon 25/2/19	Fri 8/3/19
	⚲	Discussion with supervisor and refine	9 days	Mon 11/3/19	Thu 21/3/19
	⚲	Submission	1 day	Fri 22/3/19	Fri 22/3/19
	⚲	**◢ Chapter 5: Conclusion**	**10 days**	**Mon 25/3/19**	**Fri 5/4/19**
	⚲	Analyze and Discuss Result	3 days	Mon 25/3/19	Wed 27/3/19
	⚲	Project Final Writeup	4 days	Thu 28/3/19	Tue 2/4/19
	➥	Project limitation and future writeup	1 day	Wed 3/4/19	Wed 3/4/19
	➥	Discussion with supervisor	1 day	Thu 4/4/19	Thu 4/4/19
▦	➥	Submission	1 day	Fri 5/4/19	Fri 5/4/19
	⚲	**◢ FYP2 Final Report**	**20 days**	**Mon 8/4/19**	**Fri 3/5/19**
	⚲	Refine and finalize final report	14 days	Mon 8/4/19	Thu 25/4/19
	⚲	Submission	1 day	Fri 26/4/19	Fri 26/4/19
	⚲	Preparation for presentation slide	3 days	Mon 29/4/19	Wed 1/5/19
	⚲	FYP2 Sympossium Presentation	1 day	Thu 2/5/19	Fri 3/5/19
	⚲	**◢ FYP2 Report Amendment**	**11 days**	**Mon 6/5/19**	**Mon 20/5/19**
	➥	Discussion with supervisor	1 day	Mon 6/5/19	Mon 6/5/19
	⚲	Refine FYP2	9 days	Tue 7/5/19	Fri 17/5/19
▦	➥	Submission	1 day	Mon 20/5/19	Mon 20/5/19

Figure 1.1 Project Schedule

1.8 Expected Outcome

To identify the factors that affecting the FCSIT lecturers in agreeing to be supervising FYP students by collecting the data through the web-based system and analyse them with Exploratory Factor Analysis (EFA). This research will give an overview to the administration of the faculty to understand the factors that affecting the lecturers in accepting FYP students. Thus, it can provide some insight to the problem and potentially being refer for both supervisor(s) and FYP student(s) in decision making. The process will be less time-consuming. Through this project, it can enhance the conduction of FYP in every year.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

To eliminate inappropriate and redundant data is the most important job of feature selection to improve the performance of the learning algorithms (Visalakshi, 2014). In this section, the existing works, that is the selection of employers in hiring the staffs which related to the research and research done by University Kebangsaan Malaysia (UKM) will be reviewed. Besides, some statistical analyse techniques and tools use in statistical analysis will be discussed. This reviews will give some insight on the supervisor in selecting the FYP students and helps to carry on this research.

2.2 Review on Existing Work

In every organization, staffing is a continuing activity and for this reason is most probably the dominant area of practice of industrial and organizational (I/ O) psychologists (L.Dipboye, 2018). There is an acronym namely "KSAO", which means Knowledge, Skills, Abilities and Other characteristics. This suggests that the applicants will have not only to meet some of the requirements such as knowledge and skills on the certain field, but also the abilities that the person acquired in order to allocate the applicants to some certain positions. It is more important that how the employees applied the knowledge learned on the work instead of just knowing the knowledge.

Selection and hiring are the first and most important Human Resource (HR) practice compare to other tasks during the recruitment procedure (Maryam Hajikhani, 2018). The employers will select their employee using different techniques in their hiring decisions. Those highlighted techniques are interviews, referring the work histories of the applicants, background of the applicants, test personal references and so on. There are some employers emphasize on the reliability of works, the learning speed of the applicants, the attitude of the applicants and also the trustworthiness of the employee.

However, some may rely on their intuition in spite of choosing the employee in a formal or an analytical manner.

The philosophy and practice of the scientific approaches on the decision made by the employers in selecting the employees. Many will think that the first impression of the employers on the employees is believed is the best guide compared to the impressions formed later in the selection process. But what is known is, there is no evidence which prove that the first impression is more valid than the impressions formed later in the selection process. The researches show that a structured procedure will have a higher validities and reliabilities than the unstructured procedures. For example, in an Information Technology (IT) company, the average response of the candidates very much depends on the computer skill requirements of a company (Janotik, 2016).
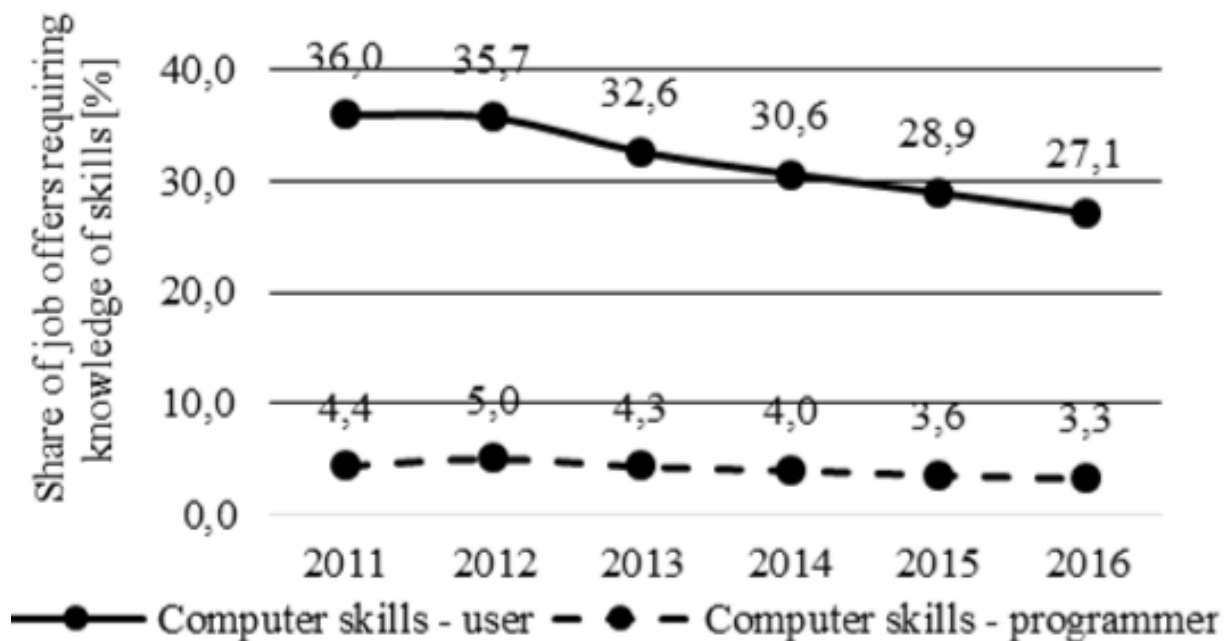

Figure 2.1 Percentage of job advertisements requiring knowledge of at least one computer skills belonging to selected skill categories (Janotik, 2016).

Referring to Figure 2.1, it is said that the selection is based on the expertise of the applicants. It is said that those who has the skills that other people does not have will be picked to be the chosen one in the position required. The scientific approach shows that although some training and

experience may affect the decision maker on making decision but there is no evidence that the people will pose a general ability to judge others. The figure below shows that the relationship between the programming skills and the requirement of the employers on employees (Janotik, 2016). If the company's requirement is too high (expert or intermediate), the company have to face a decrease in number of the available candidates. However, in such case, the company is at risk that to lose some potential candidates if the requirements are set too high when it is not necessary.
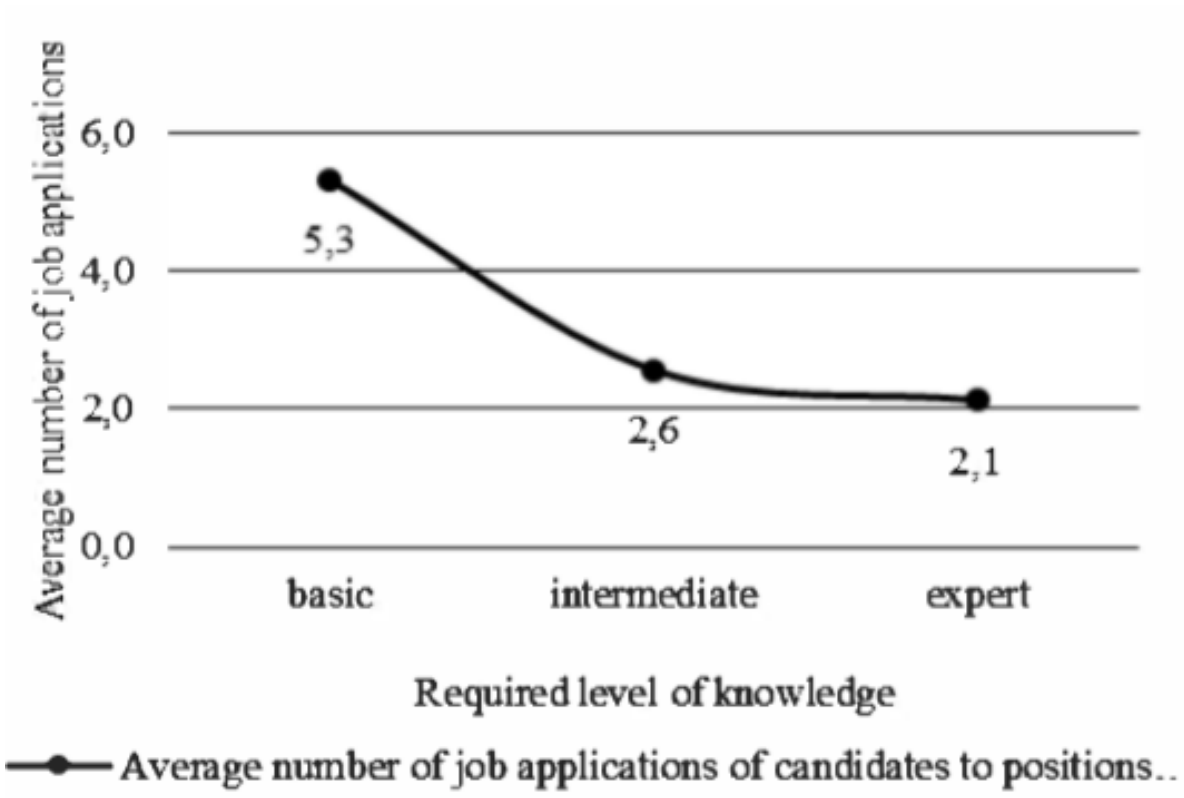

Figure 2.2 Average number of job applications of candidates in IT depending on the level of knowledge required by companies (computer skills: programmer) (Janotik, 2016).

Nevertheless, it is concerning the questions asked. It may have a thought that an interviewer who are experienced can size up an applicant with some interview questions they ask "on the fly". But in the structured procedures, there would be an evaluation which are job-related and prior to the actual encounter with the job applicants.