MATHEMATICS GRADUATES PERCEPTIONS ON SUITABILITY OF EMPLOYMENT USING LOGISTIC REGRESSION

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To my beloved family and friends

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ABSTRACT

The choice of a career is one of the important aspects for a graduate as it will determine their lifestyle and also plays an important role in the society and country. However, this selection becomes complicated due to the increasing number of graduates especially in mathematics field. Hence, this project aims to model the suitability of employment amongst mathematics graduates. Analysis was done by using IBM SPSS Statistics Version 20 and Microsoft Office Excel 2007. Since the response variable for this study is of a binary nature which is appropriate or inappropriate of perceptions on suitability of employment, the logistic regression model was applied. The first analysis is based on Logistic regression which involved both SSM and SSE graduates. A total of 40 respondents were included. The second analysis is based on Logistic regression which involved only SSM graduates. A total of 33 respondents were included. In this project, it is concluded that co-curriculum and influence of institute was the significant factors that influenced the perceptions on suitability of employment among mathematics graduates for the logistic regression that involved both SSM and SSE programme while for the logistic regression that only involved SSM programme, it concluded that ethnic, CGPA, cocurrriculum and influence of institute was the significant factor that influenced the perceptions on suitability of employment among mathematics graduates.

ABSTRAK

Pemilihan kerjaya merupakan salah satu aspek yang penting untuk kehidupan seseorang kerana ia akan menentukan gaya hidup mereka dan juga memainkan peranan penting dalam masyarakat dan negara. Walau bagaimanapun, pemilihan ini menjadi rumit disebabkan oleh peningkatan daripada graduan terutamanya dalam bidang matematik. Oleh itu, projek ini bertujuan untuk mendapatkan model bagi kesesuaian pekerjaan di kalangan graduan matematik . Analisis dilakukan dengan menggunakan IBM SPSS Statistics Version 20 dan Microsoft Office Excel 2007. Oleh sebab pemboleh ubah bagi kajian ini adalah yang bersifat binari iaitu sesuai atau tidak sesuai kesesuaian pekerjaan, Logistik regresi telah digunakan untuk memdapatkan model. Analisis pertama adalah berdasarkan Logistik regresi yang melibatkan graduan daripada SSM dan SSE . Seramai 40 orang responden terlibat dalam analisis ini. Analisis kedua adalah berdasarkan pada Logistik regresi yang hanya melibatkan graduan SSM. Seramai 33 orang responden terlibat dalam analisis ini. Dalam projek ini, dapat disimpulkan bahawa kokurikulum dan pengaruh daripada institut merupakan faktor penting yang mempengaruhi kesesuaian pekerjaan di kalangan graduan matematik untuk Logistik regresi yang melibatkan SSM dan program SSE manakala bagi Logistik regresi yang sahaja melibatkan program SSM , dapat disimpulkan bahawa etnik, PNGK, cocurrriculum dan pengaruh daripada institut merupakan faktor penting yang mempengaruhi kesesuaian pekerjaan di kalangan graduan matematik .

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LIST OF SYMBOLS

SYMBOL		DETAILS
α	-	Level of significance
p	-	Probability value
β	-	Cooeficient or unknown parameter
B	-	Estimated parameter
Y	-	Dependent variable
X	-	Independent variable
exp (.)	-	Exponential function
SE	-	Standard error
OR	-	Odds ratio
CI	-	Confidence Interval
VIF	-	Variance inflation factor
ROC	-	Receiver operating characteristic

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Currently, the employability among graduates becomes a major issue and it often associated with unemployment among graduates. Furthermore, the job offered mostly not satisfies with their qualifications. Besides, job market is more dynamic due to rapid development as well as the diverse needs of employers. Consequently, competition among graduates will occur and there is increasing on the unemployment rate.

Hence, the role of the university as a centre of learning allows students to gain deeper knowledge in accordance with country's growth. Universities definitely will develop their students in both mental and spiritual aspects. Moreover, the specific education should be implemented in order to expand the multiskills and personal attributes towards their students. This is intended to meet the demands of professional work and enhance the development of the country. Due to this aim, many programmes are available and have been offered in many universities. Indirectly, it will give a big opportunity for students to get a job in the future.

However, the issue comes up on how the quality of graduates is capable to fulfil the market needs. Many problems can be overcome if the education received is in accordance with the demands of employment.

Nevertheless, graduates cannot depend only on their academic achievement in getting jobs. Many factors that are required by the employer such as the attitudes toward work, outlook on life, mastery of basic skills such as language and ICT, the ability to think critically and others. It is found that in every year, thousands of graduates entering the job market. Therefore, the research regarding mathematics graduates perceptions on suitability of employment will be carried out.

Logistic Regression is a mathematical modelling that describes the relationship of one or several independent variables to a dichotomous dependent variable. Simple Logistic Regression is a univariable analysis that has only one independent variable in the model while multiple Logistic Regression is also known as multivariable or multivariate analysis that has more than one independent variable towards dichotomous dependent variables. In other words, Logistic Regression usually deals with the dependent variables that have two possible outcomes that are whether or not an event occurred such as dead or alive, bad or good, buy or not buy and many more. Moreover, most of interesting variables that need to be studied are dichotomous. The purpose of Logistic Regression is to predict dichotomous dependent variables on the basis of continuous and/or categorical independents. It estimates the probability of success over the probability of failure to obtain its odds. Besides, logistic regression provides knowledge of the relationships between each variable. Logistic function was invented in the 19^{th} century to describe the growth of populations and the course of autocatalytic chemical reactions. (Cramer, 2002). It became routinely available in statistical programmes in the early 80s and this model has been widely used.

Data of students from the Department of Mathematical Sciences, Faculty of Science who graduated in October 2012 (cohort 09/10) were collected from questionnaires distributed through emails. The response variable in this study is the suitability of employment based on their perceptions, whether it is either appropriate

or inappropriate with regard to their qualifications. The predictor variables are gender, course, grade (CGPA), area (rural/urban), opinions about internship, mode of job, specialization of job and type of company, internship performance, level of communication skills, level of computational skills, level of co-curriculum skills, level of confidence and level of motivation.

This study is divided into several chapters. The first chapter describes introduction, background of the study, statement of problems, objective of the study, scope of the study and significance of the study. The second chapter provides literature review of works for research related to study of employment and logistic model. Then, the third chapter will cover research methodology used in this study. Next, the fourth chapter explains the results and discussion. Finally, the last chapter provides conclusions and some recommendations.

1.2 Background of the Study

There are 20 public universities and about 60 private universities in Malaysia. It is found that most of graduates are employed within six months as well as obtain employment after graduation. However, there are still many students who fail to get the job in two years graduation (Harian Metro, 26 Nov 2012).

According to Statistics of Graduates in the Labour Force Malaysia 2011, a total of 65500 graduates were unemployed in 2010 and from this figure, about 33800 were degree holders and based on field of study, it was also found about 41.9% were in social science, business and law, and 20.6% were followed by engineering, manufacturing and construction while 18.6% from science, mathematics and computing. It showed that there is stiff competition among graduates in obtaining the job due to the large number of graduates. Therefore, graduates should be prepared

enough with extra knowledge and skills other than what they learnt in their institutions.

According to the industry sector, many graduates are unemployed due to the incompatibility between the courses taken and the market demand (KOSMO, 7 Nov 2012).Besides, employers often stated that graduates have lack of soft skills such as positive work ethic, communication skills, teamwork and the ability to make decisions and leadership skill. Another contributing factor that graduates are unemployed is because of their weaknesses in English language, lack of industrial training, lack of self-confidence and fail to convince the employers. This is a huge gap between the levels of competency graduates with international standards. Therefore this issue should be addressed to ensure that they have a qualified, versatile and high employability. In the era of globalization, employers are concern with both hard skills and soft skills in order to ensure their employees can adapt to all kinds of work especially when under pressure. According to Sharil (1993), most the industries look at the skills of employability first rather than the academic results.

Therefore, the purpose of this study is to determine the suitability of employment based on mathematics graduates perceptions and then will concentrate on determining the most significant variables that affect their perceptions on suitability of employment. This study will develop the best fit model by using logistic model.

1.3 Statement of the Problem

Employment opportunities are proportional to the development process. Nowadays, there are a lot of vacancies offered covering all levels of education. However, the unemployment rate amongst degree holders in particular who major in

mathematics is quite high. This is due to the limited vacancies as regards to mathematics graduates. It means that it is quite difficult for mathematics graduates to find the job because of the unspecified position as compared to other graduates. For instance, engineering graduates will work as an engineer and bachelors at law will work as a lawyer.

A more in-depth look reveals that Mathematics and Statistics graduates are employed in many different areas. Industry, commerce, government departments and teaching represent some of the more obvious ones. Some jobs require specific mathematical or statistical skills while others, it requires the ability to think precisely and logically although not directly involving these skills. Generally, business, industry and government want people who have a background and interest in a variety of mathematical areas, computation and science. Many of these jobs require competence in using software packages such as SPSS, R and SAS. Familiarity with spreadsheets, such as Excel, and data bases are also useful. Most jobs also require strong oral and written communication skills, well developed interpersonal skills, and the ability to work independently as well as in a team.

Therefore, this study will be conducted to determine the significant factors that influence mathematics graduates perception on suitability of employment. There are many factors which can contribute to mathematics graduates perception on suitability of employment. Two main types of factors that will be focused in this study are demographic profiles and skill factors. Such demographic profiles are gender, course, grade (CGPA) and influence of institute. On the other hand, skill factors include level of communication skills, level of computational skills, level of co-curriculum skills, level of confidence and level of motivation.

1.4 Objectives of the Study

Below are the objectives of the study:

1. To determine mathematics graduates perceptions on suitability of employment based on designed questionnaires.
2. To model mathematics graduates perceptions on suitability of employment using logistic regression model.
3. To identify the significant factors affecting mathematics graduates perceptions on suitability of employment.

1.5 Scope of the Study

The scope of this study involved all students at the Department of Mathematical Sciences, Faculty of Science who graduated in October 2012 (cohort 09/10). They are divided into two groups according to programmes which are Pure Mathematic (SSE) and Industrial Mathematic (SSM).In addition, this study only focuses on the test of association, univariable analysis, logistic regression, goodness of fit and classification table.

1.6 Significance of the Study

This study focuses on modelling mathematics graduates perceptions on suitability of employment. In this way, we can identify significant variables that affect students' employability in the job market based on their qualifications. Indirectly, students can prepare well for the jobs. Moreover, the university, prospective employers and students themselves could collaborate with each other to improve and make changes to meet the demands of the marketplace and achieve the needed goal. Besides, this study is important to ensure that the programs offered by the university will gain recognition from all parties and they can reassess the pros and cons of the programmes offered.

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