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**CLASSIFICATION OF MALAYSIAN STUDENTS' TENDENCY
IN CHOOSING TVET AFTER SECONDARY SCHOOL USING
ANALYTIC HIERARCHY PROCESS AND DECISION TREE
MODEL: A CASE STUDY IN NORTHERN PART OF MALAYSIA**



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2022**



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Abstrak

Program Pendidikan dan Latihan Teknikal dan Vokasional (TVET) merupakan satu saluran untuk melahirkan pekerja-pekerja mahir kerana program ini menyediakan pengetahuan teori dan kemahiran praktikal untuk pelajar. Namun, sehingga kini kemasukan ke program TVET di kalangan pelajar lepasan sekolah menengah adalah masih rendah. Oleh itu, kajian ini bertujuan untuk mendedahkan faktor-faktor yang mempengaruhi kecenderungan pelajar dalam kemasukan program TVET. Persepsi pelajar, komuniti, pengajar, majikan, ibu bapa, selain fasiliti, kos dan polisi telah dikenal pasti sebagai faktor-faktor dalam kajian ini. Pada fasa pertama, Proses Hierarki Analitik (AHP) digunakan untuk menentukan tahap kepentingan setiap faktor. Berdasarkan hasil daripada fasa pertama, beberapa model Pepohon Keputusan dibangunkan untuk mengklasifikasi kecenderungan pelajar untuk memasuki program TVET. Responden dalam kajian ini ialah pelajar daripada program TVET dan sekolah-sekolah menengah. Keputusan AHP menunjukkan bahawa faktor ibu bapa merupakan faktor terpenting, diikuti oleh pengajar, majikan, pelajar, kos, fasiliti, polisi dan komuniti. Seterusnya, empat jenis Pepohon Keputusan iaitu ID3, CART, C4.5 dan CHAID telah dihasilkan untuk mengklasifikasikan kecenderungan pelajar berdasarkan empat faktor terpenting (ibu bapa, pengajar, majikan dan pelajar). Pepohon Keputusan ID3 dengan 5-iterasi Validasi Silang dipilih sebagai model terbaik, disebabkan oleh kadar ralat yang rendah (0.1355), kadar ketepatan yang tinggi (0.8645), kadar kejituan yang tinggi (0.9143), kadar relevan yang tinggi (0.8828), dan skor-F yang tinggi (0.8983) dengan 7 kedalaman pepohon dan dahan maksimum 3. Justeru itu, pada masa hadapan, model ini boleh digunakan untuk mengklasifikasikan kecenderungan pelajar untuk memasuki program TVET. Model ini juga boleh membantu kerajaan untuk melaksanakan pelan strategik seperti penganjuran kempen atau penyediaan latihan di tempat kerja kepada pelajar program TVET. Sehubungan dengan itu, pekerja mahir yang boleh mengadaptasi teknologi dan inovasi baharu dapat dihasilkan.

Kata Kunci: Pendidikan dan latihan teknikal dan vokasional, Proses hierarki analitik, Pepohon keputusan, Pengkelasan

Abstract

Technical and Vocational Education and Training (TVET) programme is a channel to produce skilled workers because it provides theoretical knowledge and practical skills for students. However, the current enrolment in TVET programme among secondary school leavers is still low. Therefore, this study aims to uncover the factors that affect students' tendency in enrolling TVET programme. The perception of students, public, instructors, employers, parents, besides facility, cost and policy have been discovered as the factors in this study. In the first phase, Analytic Hierarchy Process (AHP) is used to determine the level of importance of each factor. Based on the outcome of the first phase, various Decision Tree models are developed to classify the students' tendency in enrolling TVET programme. The respondents in this study are students from the TVET programme and secondary schools. The result of AHP shows that the factor of parents is the most important factor, followed by instructors, employers, students, cost, facility, policy and public. Then, four types of Decision Tree namely ID3, CART, C4.5 and CHAID are generated to classify the students' tendency based on the four most important factors (parents, instructors, employers and students). The ID3 tree in 5-fold Cross Validation is selected as the best model due to its low misclassification rate (0.1355), high accuracy rate (0.8645), high precision rate (0.9143), high recall rate (0.8828), and high F-score (0.8983) with tree depth of 7 and maximum branches of 3. Hence, in the future, this model can be used to classify the students' tendency enrolling in TVET programme. It can also assist the government to implement strategic plans such as organizing campaigns or providing on-the-job training to students in the TVET programme. Therefore, skilled workers that can adapt to new technology and innovation could be produced.

Keywords: Technical and vocational education and training, Analytic hierarchy process, Decision tree, Classification

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Table of Contents

Permission to Use.....	ii
Abstrak	iii
Abstract	iv
Acknowledgement.....	v
Table of Contents	vi
List of Tables.....	ix
List of Figures	xi
List of Appendices	xiii
CHAPTER ONE INTRODUCTION.....	1
1.1 Background	1
1.2 Problem Statement	9
1.3 Research Questions	11
1.4 Research Objectives	12
1.5 Significance of Study	13
1.6 Scope of Study	14
1.7 Structure of Thesis	15
CHAPTER TWO LITERATURE REVIEW.....	17
2.1 Technical and Vocational Education (TVET).....	17
2.1.1 Analysis of Techniques Used to Solve TVET Issues	18
2.2 Multi-Criteria Decision Making (MCDM) Techniques	20
2.2.1 Introduction to Analytic Hierarchy Process (AHP).....	25
2.2.2 Application of Analytic Hierarchy Process (AHP)	26
2.2.3 Application of Analytic Hierarchy Process (AHP) in Education Field.....	28
2.3 Knowledge Discovery in Databases (KDD) Process	29
2.3.1 Data Mining.....	31
2.3.2 Application of Data Mining in Education Field.....	39
2.3.3 Decision Tree.....	41
2.3.4 Application of Decision Tree in the Vocational Educational Field.....	51
2.4 Application Related to the Combination of AHP and Decision Tree	52
2.5 Chapter Summary.....	56
CHAPTER THREE RESEARCH METHODOLOGY.....	64
3.1 Introduction	64

3.1.1 Methodology Flowchart	64
3.2 Research Design	67
3.2.1 Questionnaire Design	67
3.2.2 Population and Sample	68
3.2.3 Pilot Study	69
3.2.4 Cronbach-alpha Test for Questionnaire.....	70
3.3 Data Collection Method	70
3.3.1 Data Collection Among TVET Students	70
3.3.2 Data Collection Among Students in Secondary School.....	71
3.3.3 Disproportionate Stratified Sampling with Equal Allocation.....	71
3.3.4 Simple Random Sampling	73
3.4 Data Analysis	74
3.4.1 Ranking the Importance of Factors Using Analytical Hierarchy Process (AHP).....	74
3.4.2 Development of Decision Tree Models.....	77
3.5 Relationship between AHP and Decision Tree	84
3.6 Chapter Summary.....	84
CHAPTER FOUR FINDINGS.....	86
4.1 Analysis for AHP	86
4.2 Justification on Selection of Factors in the Second Questionnaire (Q2).....	93
4.3 Justification on Factors Derived from First Phase Result into Q2.....	94
4.4 Cronbach-alpha Test for the Second Questionnaire (Q2)	95
4.5 Analysis Using Decision Tree.....	95
4.5.1 Input data	96
4.5.2 Data Preprocessing	105
4.5.3 Data Partitioning.....	106
4.5.4 Development of Decision Tree Models.....	106
4.5.5 Model Evaluation	166
4.6 Chapter Summary.....	171
CHAPTER FIVE CONCLUSION.....	173
5.1 Introduction	173
5.2 Conclusion of the Study	173
5.3 Contribution of the Study.....	176
5.4 Limitations	179

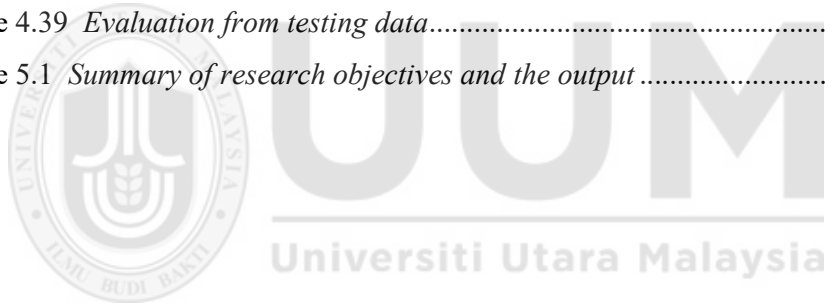
5.5 Future Work 179
REFERENCES..... 181



List of Tables

Table 1.1	<i>Summary of eight factors affecting students' decision in choosing TVET</i>	8
Table 2.1	<i>Comparison between the algorithms for Decision Tree</i>	44
Table 2.2	<i>Summary of application of techniques used discussed above.....</i>	57
Table 3.1	<i>PPD and respective DUN for the state of Kedah</i>	72
Table 3.2	<i>Location for each PPD which is randomly selected by Excel</i>	73
Table 3.3	<i>Saaty's pairwise comparison scale.....</i>	75
Table 3.4	<i>Random index</i>	76
Table 3.5	<i>Confusion matrix.....</i>	82
Table 4.1	<i>Complete comparison matrix.....</i>	87
Table 4.2	<i>Sum of column.....</i>	88
Table 4.3	<i>Division of entries by sum from TVET students' perceptions.....</i>	89
Table 4.4	<i>Average of row from TVET students' perception</i>	90
Table 4.5	<i>Weights for each factor from TVET students' perceptions</i>	91
Table 4.6	<i>Consistency measures for each factor from TVET students' perceptions ...</i>	92
Table 4.7	<i>Overview of dataset</i>	96
Table 4.8	<i>ID3 Tree rules</i>	108
Table 4.9	<i>Importance value for the variable</i>	111
Table 4.10	<i>Confusion Matrix</i>	112
Table 4.11	<i>CART rules.....</i>	115
Table 4.12	<i>Importance value for the variable</i>	117
Table 4.13	<i>Confusion Matrix</i>	118
Table 4.14	<i>C4.5 rules.....</i>	121
Table 4.15	<i>Importance value for the variable</i>	125
Table 4.16	<i>Confusion Matrix</i>	125
Table 4.17	<i>CHAID rules</i>	128
Table 4.18	<i>Importance value for the variable</i>	130
Table 4.19	<i>Confusion Matrix</i>	131
Table 4.20	<i>ID3 rules</i>	134
Table 4.21	<i>Importance value for the variable</i>	136
Table 4.22	<i>Confusion matrix.....</i>	136
Table 4.23	<i>CART rules.....</i>	139
Table 4.24	<i>Importance value for the variable</i>	141

Table 4.25	<i>Confusion Matrix</i>	142
Table 4.26	<i>C4.5 rules</i>	145
Table 4.27	<i>Importance value for the variable</i>	146
Table 4.28	<i>Confusion matrix</i>	147
Table 4.29	<i>CHAID rules</i>	150
Table 4.30	<i>Importance value for the variable</i>	151
Table 4.31	<i>Confusion matrix</i>	152
Table 4.32	<i>ID3 rules</i>	154
Table 4.33	<i>Importance value for the variable</i>	158
Table 4.34	<i>Confusion Matrix</i>	159
Table 4.35	<i>ID3 rules</i>	162
Table 4.36	<i>Importance value for the variable</i>	165
Table 4.37	<i>Confusion Matrix</i>	165
Table 4.38	<i>Evaluation from training data</i>	168
Table 4.39	<i>Evaluation from testing data</i>	169
Table 5.1	<i>Summary of research objectives and the output</i>	176



List of Figures

<i>Figure 1.1.</i> Percentage of education training by ethnicity.....	4
<i>Figure 1.2.</i> Percentage of youth in tertiary education	4
<i>Figure 2.1.</i> Structure of AHP.....	21
<i>Figure 2.2.</i> Structure of ANP.....	22
<i>Figure 2.3.</i> Structure of SAW.....	23
<i>Figure 2.4.</i> Diagram of AHP	25
<i>Figure 2.5.</i> Decision Tree structure	42
<i>Figure 2.6.</i> The structure of the Decision Tree for university admission.....	43
<i>Figure 3.1.</i> Methodology flowchart.....	66
<i>Figure 3.2.</i> Example of formula insertion in Microsoft Excel for PPD Baling.....	73
<i>Figure 3.3.</i> Decision Tree Algorithm	81
<i>Figure 4.1.</i> Reliability statistics	95
<i>Figure 4.2.</i> Process flow of Decision Tree development.....	96
<i>Figure 4.3.</i> Histograms for AcadememicSubjMoreImportant, FamilyInvolved, FatherEducation and FatherJob.....	99
<i>Figure 4.4.</i> Pie chart for gender	100
<i>Figure 4.5.</i> Histogram for HeardTVET, MotherEducation, MotherJob, PlanAfterForm5 and Stream	101
<i>Figure 4.6.</i> Horizontal histogram for TVETStudHighSalary, TVETStudHigherJobChance, VocationalCourseInteresting and VocationalSubjStatus	103
<i>Figure 4.7.</i> Statistical table for the input variables.....	104
<i>Figure 4.8.</i> Students' tendency to enrol in TVET	105
<i>Figure 4.9.</i> Decision Tree model based on ID3.....	107
<i>Figure 4.10.</i> Node 3 example	110
<i>Figure 4.11.</i> Node 6 and Node 11 examples	111
<i>Figure 4.12.</i> Decision Tree based on CART	114
<i>Figure 4.13.</i> Node 2, Node 4 and Node 7 examples.....	117
<i>Figure 4.14.</i> Decision Tree based on C4.5	120
<i>Figure 4.15.</i> Node 6 example	124
<i>Figure 4.16.</i> Node 10 example	124
<i>Figure 4.17.</i> Decision Tree based CHAID	127

<i>Figure 4.18.</i> Node 8 and Node 13 examples	130
<i>Figure 4.19.</i> Decision Tree based on ID3	133
<i>Figure 4.20.</i> Node 2 and Node 6 examples	135
<i>Figure 4.21.</i> Decision Tree based on CART	138
<i>Figure 4.22.</i> Node 2 and Node 4 examples	141
<i>Figure 4.23.</i> Decision Tree based on C4.5	144
<i>Figure 4.24.</i> Node 2, Node 3, and Node 6 examples.....	146
<i>Figure 4.25.</i> Decision Tree based on CHAID	149
<i>Figure 4.26.</i> Node 3 and node 15 examples	151
<i>Figure 4.27.</i> ID3 tree (5-fold cross validation).....	154
<i>Figure 4.28.</i> Node 7, node 15 and node 18 examples.....	158
<i>Figure 4.29.</i> ID3 tree (10-fold cross validation).....	161
<i>Figure 4.30.</i> Node 7, node 15 and node 18 examples.....	164



List of Appendices

Appendix A Questionnaire 1	205
Appendix B Questionnaire from the study of “Secondary school students’ perceptions of vocational education in Barbados”	209
Appendix C Pilot Questionnaire 2	212
Appendix D Questionnaire 2 after changes	215
Appendix E Total number of students	218
Appendix F Approval letter from KPM.....	219
Appendix G Approval letter from JPNK	220
Appendix H Approval letter from IKBN	221
Appendix I DUN in each PPD	222
Appendix J Gantt Chart	223



CHAPTER ONE

INTRODUCTION

1.1 Background

Malaysia is ranked 25th out of 64 countries from the aspects of government efficiency, economic development, business efficiency and facilities according to the World Competitiveness Yearbook (WCY) for the year 2021 announced by Institute for Management Development (IMD) World Competitiveness Centre (“Malaysia rises to 25th place”, 2021). To achieve economic expansion, Malaysia needs to concentrate on technology and engineering areas that can boost productivity in various fields, such as agriculture, manufacturing, construction etc. Currently, only 28% out of 14.76 million total workforces in Malaysia are considered qualified skilled workers. One of the ways to increase the qualified skilled worker is through Technical and Vocational Education and Training (TVET). It is a channel to produce skilled workers effectively (Zia, Tan, & Subramaniam, 2019; Ismail & Hassan, 2013).

TVET is an education system that focuses on theoretical knowledge and practical skills for students after completing secondary school in Malaysia (Yusoff, Harun, & Zakaria, 2020). It is designed to build skilled workers by providing proper training to the students in vocational institutions and trains the students to apply the skills learnt in class into their jobs (Sulaiman & Mohd Salleh, 2016). By having the ability to handle the latest technologies available in the market, the students can help to contribute to the company’s profit whilst improving the country’s economy.

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Appendix A

Questionnaire 1



Dear Respondent,

Good day, I am a Master student from Universiti Utara Malaysia (UUM). Currently, I am doing a research on “*Classification of Malaysian students’ tendency in choosing TVET after secondary school using various Decision Tree Models based Analytic Hierarchy Process*”. This survey form is conducted to understand the ranking of the factors that affect students to enrol into technical and vocational education and training (TVET) system.

Therefore, it’s my honour to invite you to participate in this research by completing this survey form. In this study, you have to fill in all the answers according to the instructions given. Participants are advised to answer the questions sincerely. All the answers given will only be used for academic purposes and will be treated confidential.

Thank you for taking your time to complete the survey. Your participation is highly appreciated.

Sincerely,

Hong Chia Ming

School of Quantitative Science

Universiti Utara Malaya

AHP QUESTIONNAIRE

Based on previous studies done by others, it is found that there are 8 main factors that affect a student's choice to enrol in TVET. Those factors are *student, public, instructors, employer, parents, facility, cost and policy*.

Comparison between pairs of criteria which evaluate the importance for each other:

Level of importance	Definition	Explanations
1	Equal importance	Both of the criteria are equally important to the goal.
3	Moderate importance	One criterion is slightly important if compared to another one.
5	Strong importance	One criterion is strong important if compared to another one.
7	Very strong importance	One criterion is very strong important if compared to another one.
9	Extreme importance	One criterion is extreme important if compared to another one.
2, 4, 6, 8	Intermediate values	They are used to compromise between two judgment.

Which criteria is more important when comparing the following pairs? Please circle the one that is more important.

I. Example one:

Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Public
---------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--------

From example one, it can be shown that the student factor has a very strong importance than the public in affecting a student's choice in choosing TVET.

II. Example two:

Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Public
---------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--------

From example two, it can be shown that both of the factors (student and public) are equally important in affecting a student's choice in choosing TVET.

Please answer the questions based on your own opinion.

Question 1

If the student factor is compared with the factors (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?

Factor I	Evaluation																		Factor II
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Public	
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Instructors	
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Employer	
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Parents	
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Facility	
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost	
Student	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy	

Question 2

If the public factor is compared with the factors (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?

Factor I	Evaluation																		Factor II
Public	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Instructors	
Public	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Employer	
Public	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Parents	
Public	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Facility	
Public	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost	
Public	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy	

Question 3

If the TVET instructors' factor is compared with the factors (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?

Factor I	Evaluation																		Factor II
Instructors	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Employer	
Instructors	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Parents	
Instructors	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Facility	
Instructors	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost	

Instructors	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy
<p>Question 4 If the employer factor is compared with the factors (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?</p>																		
Factor I	Evaluation																Factor II	
Employer	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Parents
Employer	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Facility
Employer	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost
Employer	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy
<p>Question 5 If the parents factor is compared with the factors (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?</p>																		
Factor I	Evaluation																Factor II	
Parents	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Facility
Parents	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost
Parents	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy
<p>Question 6 If the technical institutions factor is compared with the factors (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?</p>																		
Factor 1	Evaluation																Factor II	
Facility	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost
Facility	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy
<p>Question 7 If the education cost factor is compared with the factor (as shown in the right column), what do you think is more significant factors that affect a student's choice to enrol in TVET system?</p>																		
Factor I	Evaluation																Factor II	
Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy

THANK YOU FOR YOUR COOPERATION

Appendix B

Questionnaire from the study of “Secondary school students’ perceptions of vocational education in Barbados”.

Please do not write your name on the questionnaire. Any information you give is strictly confidential.

1. Select your gender Male Female

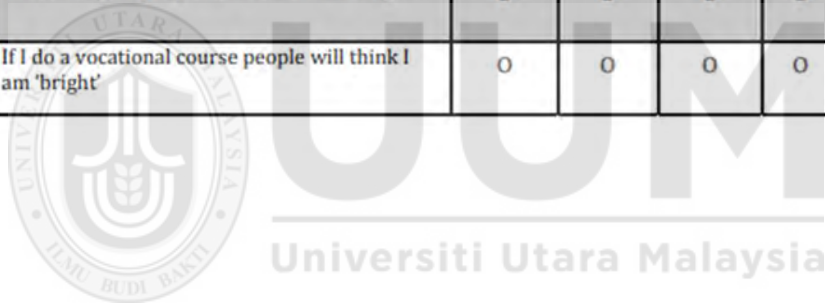
2. Home background

Parent’s level of education	Shade the appropriate answer
Father’s level of education <input type="radio"/> Did not complete Secondary School <input type="radio"/> Completed CXC’s/GCE/O’ levels <input type="radio"/> Completed A levels/Associate Degree <input type="radio"/> Completed degree <input type="radio"/> Post graduate level <input type="radio"/> Unsure	Mother’s level of education <input type="radio"/> Did not complete Secondary School <input type="radio"/> Completed CXC’s/GCE/O’ levels <input type="radio"/> Completed A levels/Associate Degree <input type="radio"/> Completed degree <input type="radio"/> Post graduate level <input type="radio"/> Unsure

Parents’ occupation	Shade the appropriate answer
Father’s occupation <input type="radio"/> Manufacturing <input type="radio"/> Agriculture <input type="radio"/> Construction <input type="radio"/> Retail <input type="radio"/> Clerical/Civil service <input type="radio"/> Professional <input type="radio"/> Tourism <input type="radio"/> Self employed _____ <input type="radio"/> Unemployed <input type="radio"/> Other _____	Mother’s occupation <input type="radio"/> Manufacturing <input type="radio"/> Agriculture <input type="radio"/> Construction <input type="radio"/> Retail <input type="radio"/> Clerical/Civil service <input type="radio"/> Professional <input type="radio"/> Tourism <input type="radio"/> Self employed _____ <input type="radio"/> Unemployed/Homemaker <input type="radio"/> Other _____

3. Student perceptions of education and training

	Strongly disagree	Disagree	Uncertain	Agree	Strongly Agree
Vocational subjects have a high status	0	0	0	0	0
Academic subjects have a high status	0	0	0	0	0
Vocational courses are difficult	0	0	0	0	0
Academic courses are difficult	0	0	0	0	0
Academic subjects are more important than vocational subjects	0	0	0	0	0
People with degrees get the best jobs	0	0	0	0	0
People with degrees make more money	0	0	0	0	0
People who go to University have a better chance of getting a job than those who do not	0	0	0	0	0
If I do a degree people will think I am 'bright'	0	0	0	0	0
If I do a vocational course people will think I am 'bright'	0	0	0	0	0



4. Student aspirations

What are your study plans after 5th form?	Shade the appropriate answer
<ul style="list-style-type: none"><input type="radio"/> Skills Training Centre<input type="radio"/> SJPP (Polytechnic)<input type="radio"/> 6th form<input type="radio"/> BCC (Barbados Community College)<input type="radio"/> UWI<input type="radio"/> Other university<input type="radio"/> Work<input type="radio"/> Other _____<input type="radio"/> Unsure	

What field would you like to work in?	Shade the appropriate answer
<ul style="list-style-type: none"><input type="radio"/> Manufacturing<input type="radio"/> Agriculture<input type="radio"/> Construction<input type="radio"/> Retail<input type="radio"/> Clerical/Civil Service<input type="radio"/> Professional<input type="radio"/> Tourism<input type="radio"/> Self employed _____<input type="radio"/> Other _____<input type="radio"/> Unsure	

Which do you feel will best prepare you for your chosen field?	Shade the appropriate answer
<ul style="list-style-type: none"><input type="radio"/> Skills Training Centre<input type="radio"/> SJPP (Polytechnic)<input type="radio"/> 6th form<input type="radio"/> Barbados Community College (BCC)<input type="radio"/> UWI<input type="radio"/> Other university<input type="radio"/> Work<input type="radio"/> Other _____<input type="radio"/> Unsure	

Appendix C

Pilot Questionnaire 2



Dear Respondent,

Good day, I am Master students from Universiti Utara Malaysia (UUM). Currently, I am doing a research on “*Classification of Malaysian students’ tendency in choosing TVET after secondary school using various Decision Tree Models based Analytic Hierarchy Process*”. This survey form is conducted to understand the student’s perception towards Technical Vocational Education & Training (TVET). Therefore, it’s my honour to invite you to participate in this research by completing this survey form.

In this study, you have to fill in all the answers according to the instructions given. Participants are advised to answer the questions sincerely. All the answers given will only be used for academic purposes and will be treated confidential.

Thank you for taking your time to complete the survey. Your participation is highly appreciated.

Sincerely,

Hong Chia Ming

School of Quantitative Science

Universiti Utara Malaysia

Please tick (/) the best answer that applies to you on each question.

Section A: General information of student

1. Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
2. Age	
3. Current streams	<input type="checkbox"/> Science <input type="checkbox"/> Literature <input type="checkbox"/> Technical <input type="checkbox"/> Vocational <input type="checkbox"/> ICT <input type="checkbox"/> Account <input type="checkbox"/> Economy <input type="checkbox"/> Commerce <input type="checkbox"/> Arts <input type="checkbox"/> Catering <input type="checkbox"/> Landscape
4. Have you heard about TVET?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Section B: Information about the student's family

5. Father's level of education <input type="checkbox"/> Did not complete secondary school <input type="checkbox"/> SPM <input type="checkbox"/> Foundation / A-Level / Matriculation level <input type="checkbox"/> STPM level <input type="checkbox"/> Diploma level <input type="checkbox"/> Degree level <input type="checkbox"/> Postgraduate level	6. Father's occupation <input type="checkbox"/> Manufacturing <input type="checkbox"/> Agriculture <input type="checkbox"/> Construction <input type="checkbox"/> Retail <input type="checkbox"/> Clerical / Civil Service <input type="checkbox"/> Professional <input type="checkbox"/> Self-employed <input type="checkbox"/> Unemployed
7. Mother's level of education <input type="checkbox"/> Did not complete secondary school <input type="checkbox"/> SPM <input type="checkbox"/> Foundation / A-Level / Matriculation level <input type="checkbox"/> STPM level <input type="checkbox"/> Diploma level <input type="checkbox"/> Degree level <input type="checkbox"/> Postgraduate level	8. Mother's occupation <input type="checkbox"/> Manufacturing <input type="checkbox"/> Agriculture <input type="checkbox"/> Construction <input type="checkbox"/> Retail <input type="checkbox"/> Clerical / Civil Service <input type="checkbox"/> Professional <input type="checkbox"/> Self-employed <input type="checkbox"/> Unemployed
9. Did anybody in your family enrol in TVET?	<input type="checkbox"/> Yes, number of persons enrolled: <hr style="width: 50px; margin-left: 0;"/> <input type="checkbox"/> No

Section C: Student's perceptions of education and training

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
10. Vocational subjects have a high status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Vocational courses are interesting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Academic (non-vocational) subjects are more important than vocational subjects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. People who take TVET courses can get the best jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. People who take TVET courses can make more money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. People who take TVET courses have a better chance of getting a job than those who do not	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section D: Student's aspiration

16. What are your study plans after Form 5?	<input type="checkbox"/> Form 6 <input type="checkbox"/> Matriculation <input type="checkbox"/> Private University/ College <input type="checkbox"/> Polytechnic <input type="checkbox"/> Skill Training Centre <input type="checkbox"/> Work
17. What field would you like to work in?	<input type="checkbox"/> Manufacturing <input type="checkbox"/> Agriculture <input type="checkbox"/> Construction <input type="checkbox"/> Retail <input type="checkbox"/> Clerical / Civil Service <input type="checkbox"/> Professional <input type="checkbox"/> Self-employed <input type="checkbox"/> Unemployed
18. Are you interested to go into TVET?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Appendix D

Questionnaire 2 after changes



Pelajar yang dihormati,

Saya Hong Chia Ming, pelajar ijazah sarjana dari Universiti Utara Malaysia sedang menjalankan penyelidikan yang bertajuk “*Classification of Malaysian students’ tendency in choosing TVET after secondary school using various Decision Tree Models based Analytic Hierarchy Process*”. Tujuan kajian ini dijalankan adalah untuk meninjau tahap kefahaman pelajar sekolah menengah terhadap program TVET, serta memprofilkan kecenderungan pelajar untuk memilih bidang ini selepas tamat pengajian. Justeru, saya amat memerlukan bantuan anda untuk mengisi soal selidik ini.

Anda diminta untuk menjawab semua soalan. Soal selidik ini akan mengambil masa lebih kurang 15 minit. Kesemua maklumat adalah sulit dan anda tidak perlu mengisi nama anda. Saya dahului dengan jutaan terima kasih atas kerjasama dan kesudian anda untuk meluangkan masa mengisi borang soal selidik ini.

Yang Benar,

Hong Chia Ming
Decision Science Department
School of Quantitative Science
Universiti Utara Malaysia

Sila (/) di jawapan yang paling sesuai berkaitan diri anda.

Seksyen A: Maklumat am pelajar

1. Jantina	<input type="checkbox"/> Lelaki <input type="checkbox"/> Perempuan
2. Umur	
3. Aliran	<input type="checkbox"/> Sains <input type="checkbox"/> Kesusasteraan <input type="checkbox"/> Teknikal <input type="checkbox"/> Vokasional <input type="checkbox"/> ICT <input type="checkbox"/> Akaun <input type="checkbox"/> Ekonomi <input type="checkbox"/> Perniagaan <input type="checkbox"/> Seni <input type="checkbox"/> Katering <input type="checkbox"/> Landskap
4. Adakah anda mengetahui tentang TVET sebelum ini?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak

Seksyen B: Maklumat tentang keluarga pelajar

5. Tahap Pendidikan Bapa <input type="checkbox"/> Tidak menamatkan sekolah menengah <input type="checkbox"/> SPM <input type="checkbox"/> Asasi / A-Level /Matrikulasi <input type="checkbox"/> STPM <input type="checkbox"/> Diploma <input type="checkbox"/> Ijazah Sarjana Muda <input type="checkbox"/> Kedoktoran (PhD)	6. Pekerjaan Bapa <input type="checkbox"/> Pembuatan <input type="checkbox"/> Pertanian <input type="checkbox"/> Pembinaan <input type="checkbox"/> Peruncitan <input type="checkbox"/> Penjawat awam/kakitangan kerajaan <input type="checkbox"/> Profesional <input type="checkbox"/> Bekerja Sendiri <input type="checkbox"/> Tidak bekerja <input type="checkbox"/> Lain-lain: _____
7. Tahap Pendidikan Ibu <input type="checkbox"/> Tidak menamatkan sekolah menengah <input type="checkbox"/> SPM <input type="checkbox"/> Asasi / A-Level /Matrikulasi <input type="checkbox"/> STPM <input type="checkbox"/> Diploma <input type="checkbox"/> Ijazah Sarjana Muda <input type="checkbox"/> Kedoktoran (PhD)	8. Pekerjaan Ibu <input type="checkbox"/> Pembuatan <input type="checkbox"/> Pertanian <input type="checkbox"/> Pembinaan <input type="checkbox"/> Peruncitan <input type="checkbox"/> Penjawat awam/ Kakitangan kerajaan <input type="checkbox"/> Profesional <input type="checkbox"/> Bekerja Sendiri <input type="checkbox"/> Tidak bekerja <input type="checkbox"/> Lain-lain: _____
9. Adakah ahli keluarga anda terlibat dalam TVET?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak

Seksyen C: Persepsi pelajar terhadap TVET

	Sangat Tidak Setuju	Tidak Setuju	Tidak Pasti	Setuju	Sangat Setuju
10. Subjek vokasional mempunyai status tinggi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Subjek akademik (bukan vokasional) mempunyai status tinggi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Kursus vokasional adalah menarik	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Kursus akademik (bukan vokasional) adalah menarik	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Subjek akademik (bukan vokasional) adalah lebih penting daripada subjek vokasional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Orang yang mengambil kursus TVET mendapat pekerjaan yang baik	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Orang yang mengambil kursus TVET mendapat pendapatan lebih tinggi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Orang yang mengambil kursus TVET mempunyai peluang pekerjaan yang lebih baik berbanding dengan mereka yang tidak mengambil kursus TVET.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section D: Aspirasi pelajar

18. Apakah rancangan anda selepas Tingkatan 5?	<input type="checkbox"/> Tingkatan 6 <input type="checkbox"/> Matrikulasi <input type="checkbox"/> Universiti atau Kolej swasta <input type="checkbox"/> Politeknik <input type="checkbox"/> Pusat Latihan Kemahiran <input type="checkbox"/> Bekerja
19. Apakah bidang yang ingin anda ceburi?	<input type="checkbox"/> Pembuatan <input type="checkbox"/> Pertanian <input type="checkbox"/> Pembinaan <input type="checkbox"/> Peruncitan <input type="checkbox"/> Pekeranian / Perkhidmatan Awam <input type="checkbox"/> Profesional <input type="checkbox"/> Bekerja Sendiri
20. Adakah anda berminat untuk memasuki TVET?	<input type="checkbox"/> Ya <input type="checkbox"/> Tidak

Appendix F

Approval letter from KPM



KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
ARAS 1-4, BLOK B5
KOMPLEKS KERAJAAN PARCEL E
PUSAT Pentadbiran Kerajaan Persekutuan
62604 PUTRAJAYA.

TEL : 0388846591
FAXS : 0388846579

Ruj. Kami : KPM.600-3/2/3-eras(5123)
Tarikh : 20 September 2019

DR. CH'NG CHEE KEONG
NO. KP : 840314025895

PUSAT PENGAJIAN SAINS KUANTITATIF, UNIVERSITI UTARA MALAYSIA
8010 CHANGLIOM
KEDAH

Tuan,

KELULUSAN BERSYARAT UNTUK MENJALANKAN KAJIAN :
PROFILING THE TENDENCY OF SECONDARY SCHOOL STUDENTS TO CHOOSE TECHNICAL AND VOCATIONAL
EDUCATION AND TRAINING (TVET) AS THE FIRST CHOICE OF EDUCATION IN MALAYSIA.

Perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa permohonan tuan untuk menjalankan kajian seperti di bawah telah diluluskan dengan syarat :

" PENGUTIPAN DATA TIDAK BOLEH MELIBATKAN MURID KELAS PEPERIKSAAN "

3. Kelulusan adalah berdasarkan kepada kertas cadangan penyelidikan dan instrumen kajian yang dikemukakan oleh tuan kepada bahagian ini. Walau bagaimanapun kelulusan ini bergantung kepada kebenaran Jabatan Pendidikan Negeri dan Pengebua / Guru Besar yang berkenaan.

4. Surat kelulusan ini sah digunakan bermula dari 1 Oktober 2019 hingga 1 Mac 2020

5. Tuan dikehendaki menyerahkan senaskhah laporan akhir kajian dalam bentuk *hardcopy* bersama salinan *softcopy* berformat pdf dalam CD kepada Bahagian ini. Tuan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak diterbitkan di mana-mana forum, seminar atau diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

Ketua Sektor
Sektor Penyelidikan dan Penilaian
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia

salinan kepada:-

JABATAN PENDIDIKAN KEDAH

* SURAT INI DIJANA OLEH KOMPUTER DAN TIDAK TANDATANGAN (DIPERLUKAN) *

Appendix G

Approval letter from JPNK



KEMENTERIAN PENDIDIKAN MALAYSIA
JABATAN PENDIDIKAN NEGERI KEDAH
KOMPLEKS PENDIDIKAN, JALAN STADIUM
05604 ALOR SETAR
KEDAH DARUL AMAN

Telefon : 04-9404000
Faks : 04-7404342
Laman Web : www.moe.gov.my

Ruj Kami : JPNK.SPS.UPP800-1/1/2 Jld.10(26)
Tangh 24 September 2019

Dr. Ch'ng Choe Keong
Pusat Pengajian Sains Kuantitatif
Universiti Utara Malaysia
06010 Changlun
Kedah Darul Aman

Tuan,

**Kebeheraan Untuk Menjalankan Kajian/ Soal Selidik di Jabatan Pendidikan Negeri /
Pejabat Pendidikan Daerah dan Sekolah – Sekolah di Negeri Kedah Darul Aman**

Saya dengan hormatnya diarah merujuk kepada perkara tersebut di atas.

2. Dimaklumkan bahawa permohonan tuan/puan untuk menjalankan kajian yang bertajuk
" Profiling The Tendency Of Secondary School Students To Choose Technical And
Vocational Education And Training (TVET) As The First Choice Of Education In
Malaysia" diluluskan dengan syarat pengutipan data tidak boleh melibatkan murid kelas
peperiksaan

3. Kelulusan ini adalah berdasarkan kepada apa yang terkandung di dalam cadangan
penyelidikan yang tuan/puan kemukakan ke Kementerian Pendidikan Malaysia. Tuan/Puan
dihendaki mengemukakan sebarang laporan akhir kajian setelah selesai kelak dan
diingatkan supaya mendapat kebenaran terlebih dahulu daripada Jabatan ini sekiranya
sebahagian atau sepenuhnya dapatan kajian tersebut hendak dibentangkan di mana-mana
forum, seminar atau diumumkan kepada media

4. Kebenaran ini adalah tertakluk kepada persetujuan Pengetua/ Guru Besar sekolah
berkenaan dan adalah sah bermula dari 1 Oktober 2019 hingga 1 Mac 2020.

Sekian, terima kasih.

" BERKHIDMAT UNTUK NEGARA "
" KEDAH AMAN MAKMUR- HARAPAN BERSAMA MAKMURKAN KEDAH "
" PENDIDIKAN CEMERLANG KEDAH TERBILANG "






Saya yang menjalankan amanah,

(ABD AZIZ BIN SELAIMAN)
Pegawai Pendidikan
Jabatan Pendidikan Negeri Kedah

JL. JOSEPH PUSKASARI

Appendix H

Approval letter from IKBN

	INSTITUT KEMAHIRAN BELIA NEGARA KUALA PERLIS KEMENTERIAN BELIA DAN SUKSES MALAYSIA Jalan Bukit Kubu 02000 Kuala Perlis PERLIS MALAYSIA	 
		Telahan : 04-9852682 Faks : 04-9852434 Laman Web : www.ikbn.gov.my
<hr/>		
Peogarah, Institut Kemahiran Belia Negara Kuala Perlis, Jalan Bukit Kubu, 02000 Kuala Perlis, Perlis.		
<hr/>		
Hong Chia Ming, Pusat Pengajian Sains Kuantitatif, Universiti Utara Malaysia, 06010 Sintok, Kedah Darul Aman.		
		3 Januari 2020
<hr/>		
Puan,		
PERMOHONAN KEBENARAN MENJALANKAN KAJIAN PENYELIDIKAN SARJANA DI IKBN KUALA PERLIS		
Dengan segala hormatnya perkara di atas adalah dirujuk.		
2. Sukacita dimaklumkan kepada Puan bahawa Pihak IKBN Kuala Perlis membenarkan Puan untuk menjalankan kajian "Profiling the tendency of secondary school students to choose Technical and Vocational Education and Training (TVET) as the first choice of education in Malaysia" pada warga IKBN Kuala Perlis.		
3. Semoga dengan kebenaran ini dapat membantu pihak puan menjayakan kajian penyelidikan sarjana ini dengan lancar.		
Sekian.		
		
(Roshida Binti Hashim) Ketua Bahagian Hal Ehwal Pelajar IKBN Kuala Perlis Perlis.		
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Appendix I

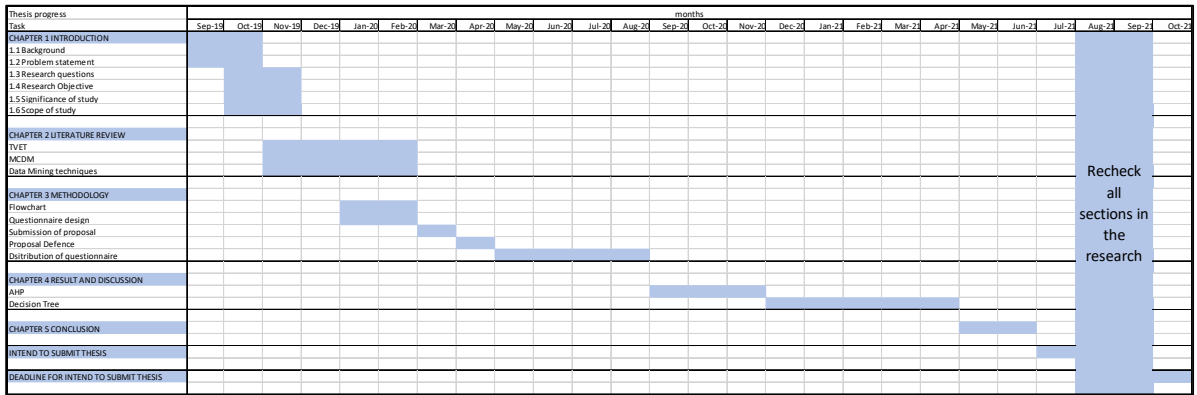
DUN in each PPD

https://drive.google.com/file/d/1y338Bk_M716YWxYth2lCZizMQ0Pgp479/view?usp=sharing

DUN	PPD BALING	PPD KOTA SETAR	PPD KUALA MUDA/YAN	PPD KUBANG PASU	PPD KULIM/BANDAR BAHARU	PPD LANGKAWI	PPD PADANG TERAP	PPD PENDANG	PPD SIK	JUMLAH
ALOR MENGKUDU		5								5
ANAK BUKIT		4								4
AYER HANGAT						3				3
AYER HITAM				8						8
BAKAR ARANG			9							9
SUKA MENANTI (BAKAR BATA)		3								3
BANDAR BAHARU					6					6
BAYU	6									6
BELANTEK									5	5
BUKIT KAYU HITAM				6						6
BUKIT LADA		5								5
BUKIT PINANG		7								7
BUKIT SELAMBAU			6							6
DERGA		4								4
GUAR CEMPEDAK			6							6
GURUN			6					1		7
JENERI									4	4
JITRA				8						8
KOTA DARUL AMAN		3								3
KOTA SIPUTEH				3						3
KUAH						5				5
KUALA KETIL	4									4
KUALA NERANG							5			5
KUBANG ROTAN		6								6
KULIM					9					9
KUPANG	6									6
LUNAS					10					10
MERBAU PULAS					7					7
PANTAI MERDEKA			5							5
PEDU							4			4
PENKALAN KUNDOR		5								5
SIDAM			6							6
SUNGAI LIMAU			5							5
SUNGAI TIANG								6		6
TANJONG DAWAI			5							5
TOKAI								6		6
JUMLAH	16	42	48	25	32	8	9	13	9	202

Appendix J

Gantt Chart



UUM
Universiti Utara Malaysia