

**DETERMINATION OF KEY FACTORS INFLUENCING
DATA ANALYTICS COURSE AWARENESS AMONG
BACHELOR STUDENTS IN THE EAST COAST OF THE
PENINSULAR MALAYSIA**

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by

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A thesis submitted in fulfillment of the requirements for the
Bachelor of Entrepreneurship (Commerce) with Honours

Faculty of Entrepreneurship and Business
UNIVERSITI MALAYSIA KELANTAN

2024

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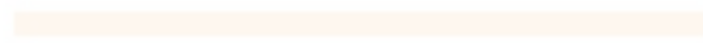
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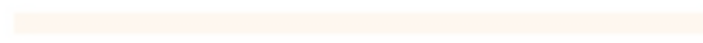
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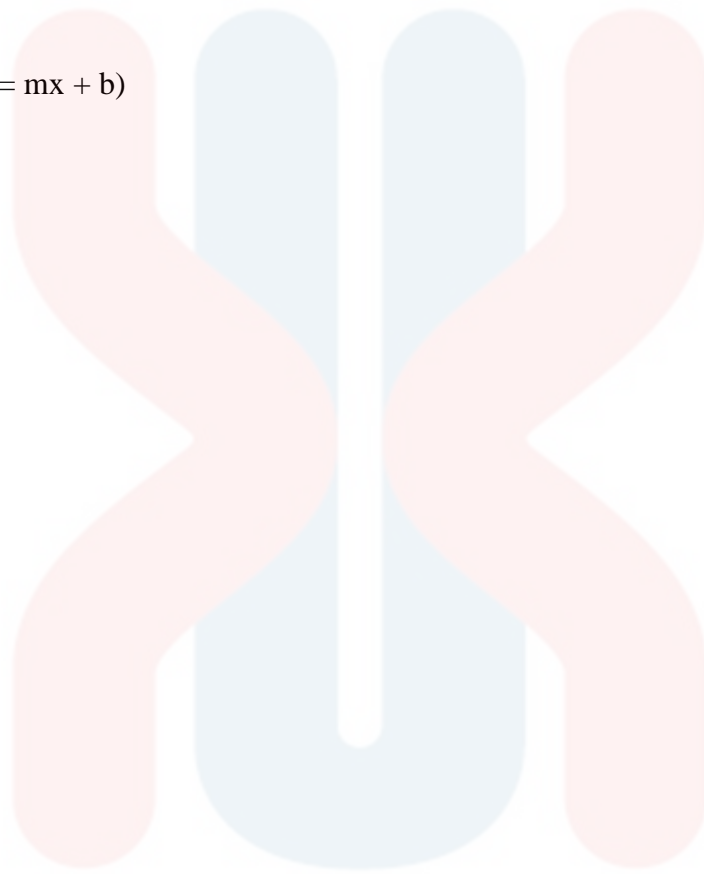
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LIST OF FORMULAS

Content

Linear Equation ($y = mx + b$)



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LIST OF ABBREVIATIONS

Contents

A = Agree

A1 = Section A Question 1

A2 = Section A Question 2

A3 = Section A Question 3

A4 = Section A Question 4

A5 = Section A Question 5

B1 = Section B Question 1

B2 = Section B Question 2

B3 = Section B Question 3

C1 = Section C Question 1

C2 = Section C Question 2

C3 = Section C Question 3

D1 = Section D Question 1

D2 = Section D Question 2

D3 = Section D Question 3

DA = Disagree

DACA = Data Analytics Course Awareness

DOSM = Department of Statistics

DV = Dependent Variable

DV1 = Dependent Variable 1

DV2 = Dependent Variable 2

DV3 = Dependent Variable 3

ECPM = East Coasts of the Peninsular Malaysia

GF = Google Form

H1 = Hypothesis 1

H2 = Hypothesis 2

H3 = Hypothesis 3

ICT = Information and Communications Technology

IR4.0 = Fourth Industrial Revolution

IV = Independent Variable

IVA = Independent Variable of Attitude

IVA1 = Independent Variable of Attitude 1

IVA2 = Independent Variable of Attitude 2

IVA3 = Independent Variable of Attitude 3

IVB = Independent Variable of Perceived Behavioural Control

IVB1 = Independent Variable of Perceived Behavioural Control 1

IVB2 = Independent Variable of Perceived Behavioural Control 2
IVB3 = Independent Variable of Perceived Behavioural Control 3
IVSN = Independent Variable of Subjective Norm
IVSN1 = Independent Variable of Subjective Norm 1
IVSN2 = Independent Variable of Subjective Norm 2
IVSN3 = Independent Variable of Subjective Norm 3
N = Neutral
NO. = Number
PBC = Perceived Behavioral Control
QoS = Quality of Service
Resp't = Respondent
SA = Strongly Agree
SDA = Strongly Disagree
SmartPLS = Structural Equation Modeling Partial Least Squares
SN = Subjective Norm
SPSS = Statistical Package for the Social Sciences
Std. Deviation / SD = Standard Deviation
STEM = Science, Technology, Engineering and Mathematics
TPB = Theory of Planned Behaviour
TRA = Theory of Reasoned Action

LIST OF SYMBOLS

Contents

N = Total Population

β = Path Coefficient

p = Significant Value

% = Percentage

** = Multiplication

r = Correlation Coefficient



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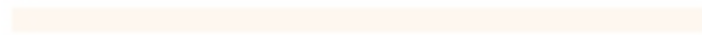
ABSTRACT

Currently, the use of data analytics is increasing and widespread in various industries around the world. It is certain that the workforce needed now is those who are skilled in the field. However, the courses taken by bachelor students at this time mostly do not meet the needs and demands of the industry, which causes them not to get a career success and even creates and contributes to unemployment in a high percentage rate. Therefore, this study aims to determine the key factors that influencing data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia. This study contained attitude, subjective norm and perceived behavioural control as the key factors to data analytics course awareness. This study employs the Theory of Planned Behaviour (TPB) as its theoretical framework. The method was used in this study is quantitative method. Questionnaire through Google Form was used to collect data from the respondents. The software used to analyze statistical data is Statistical Package for the Social Sciences (SPSS) and SmartPLS. The data analysis, including pilot test involved preliminary analysis, descriptive statistics, normality test, frequency analysis, reliability analysis and correlation of coefficient. The number of respondents in this research are 400 respondents that focused on bachelor students in the East Coast of the Peninsular Malaysia, specifically in the states of Kelantan, Terengganu and Pahang. The finding of this research revealed a significant positive relationship between attitude, subjective norm and perceived behavioural control with bachelor students' awareness of data analytics courses. Together, these factors form a comprehensive understanding of the pivotal elements influencing bachelor students' awareness in this domain. In the future, the scope of this study can be further expanded by focusing on diploma level students as a target. The study area can also be further expanded by studying students from different areas

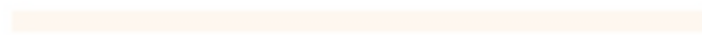
such as the West Coast or the South Coast of Peninsular Malaysia. In addition, studies can also focus students in a specific field such as business students.



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ABSTRAK

Pada masa kini, kegunaan analisis data semakin meningkat dan tersebar di pelbagai industri di seluruh dunia. Adalah pasti bahawa tenaga kerja yang diperlukan sekarang ialah mereka yang mahir dalam bidang ini. Namun begitu, mata pelajaran yang diambil oleh pelajar sarjana pada masa ini kebanyakannya tidak memenuhi keperluan dan tuntutan industri, yang menyebabkan mereka tidak mencapai kejayaan kerjaya dan malah menyumbang kepada kadar pengangguran yang tinggi. Oleh itu, kajian ini bertujuan untuk menentukan faktor-faktor utama yang mempengaruhi kesedaran pelajar sarjana di Pantai Timur Semenanjung Malaysia terhadap kursus analisis data. Kajian ini merangkumi sikap, norma subjektif dan kawalan tingkah laku yang dirasakan sebagai faktor-faktor utama kesedaran terhadap kursus analisis data. Kajian ini menggunakan Teori Perancangan Tingkah Laku (TPB) sebagai kerangka teoritinya. Kaedah yang digunakan dalam kajian ini ialah kaedah kuantitatif. Borang soal selidik melalui Google Form digunakan untuk mengumpul data daripada responden. Perisian yang digunakan untuk menganalisis data statistik ialah Statistical Package for the Social Sciences (SPSS) dan SmartPLS. Analisis data, termasuk ujian pra, melibatkan analisis awalan, statistik deskriptif, ujian normaliti, analisis frekuensi, analisis kebolehpercayaan dan korelasi koefisien. Jumlah responden dalam penyelidikan ini adalah 400 responden yang berfokus pada pelajar sarjana di Pantai Timur Semenanjung Malaysia, khususnya di negeri Kelantan, Terengganu dan Pahang. Hasil kajian ini mendedahkan hubungan positif yang signifikan antara sikap, norma subjektif dan kawalan tingkah laku yang dirasakan dengan kesedaran pelajar sarjana terhadap kursus analisis data. Secara keseluruhannya, faktor-faktor ini membentuk pemahaman menyeluruh tentang unsur-unsur penting yang mempengaruhi kesedaran pelajar sarjana dalam domain ini. Pada masa depan, skop kajian ini boleh diperluaskan dengan memberi tumpuan kepada pelajar peringkat diploma

sebagai sasaran. Kawasan kajian juga boleh diperluaskan dengan mengkaji pelajar dari kawasan lain seperti Pantai Barat atau Pantai Selatan Semenanjung Malaysia. Selain itu, kajian juga boleh memberi tumpuan kepada pelajar dalam bidang tertentu seperti pelajar perniagaan.



CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Data analytics is the study of analyzing raw data to make conclusions about information (Frankenfield, 2023). Data analytics thrives and become an asset in various industries (Amira, 2022). It became extremely important as data-driven decision-making was essential to many industries including technology, business and healthcare. In the context of the Peninsular Malaysia's East Coast, comprising Kelantan, Terengganu and Pahang, the focus intensified on the pivotal role of data analytics education. The region held unique potential to equip graduates with the knowledge and skills essential for catalyzing economic growth. Understanding the factors that shaped students' awareness of data analytic courses became paramount, particularly as educational institutions strove to meet the escalating demand for individual's adept in data analytics.

The goal of data analytics education is to provide students with the information and abilities they needed to use data to make well-informed decisions. This covers a broad range of subjects including Excel analytics, business analytics, data science, data mining, machine learning, statistical analysis, data visualization and Python. For instance, a data analytic course might have offered modules on predictive analytics using tools such as Python or R, allowing students to work on real-world data sets to solve business problems. It is critical to recognize the importance of data analytics education as it not only influenced students' career futures but also fosters the development and innovation of economies and companies. The Data Analytics Program is definitely able to produce human capital with highly knowledgeable, highly skilled and competitive to continue contributing to the development of the country (Satari, 2019).

Thus, to understand how attitude, subjective norm (SN) and perceived behavioral control (PBC) interacted to shape bachelor students' awareness of data analytics courses on the East Coast of Peninsular Malaysia (ECPM), this research set out to investigate the complex relationships between these factors. The research was specifically designed to look at the subtle effects of each of these components separately. The research hoped to improve the standard of data analytics education by taking a more nuanced approach and better matching it to the requirements and expectations of students. The outcomes of the research ultimately sought to direct legislators and academic institutions in the creation and execution of thorough data analytics curricula that spoke to the interests and comprehension of students in the area. It was within this context that we chose the title of the research project, Determination of Key Factors Influencing Data Analytics Course Awareness among Bachelor Students in the East Coast of the Peninsular Malaysia.

1.2 Problem Statement

In the rapidly evolving East Coast of the Peninsular Malaysia, a student's ability to succeed academically was a prerequisite for securing better jobs and launching fulfilling careers. The knowledge and understanding of data analytics courses among bachelor students played a pivotal role in determining their academic success. These courses equipped students with the necessary tools to thrive in the data-driven industry of that time, but a mismatch between academic learning and industry demands could have led to underemployment or unemployment when graduates struggled to find jobs aligned with their qualifications. The absence of exposure and guidance on career prospects often resulted in students making mistakes by not researching potential careers that aligned with their academic qualifications (Mohamed, Hashim, and Ibrahim, 2022). Therefore,

ensuring that academic achievements translated into career success required addressing the alignment between academics and industry.

In the East Coast of the Peninsular Malaysia, unemployment was a significant issue especially for recent graduates. According to the Department of Statistics (DOSM), the unemployment rate in the state of Kelantan was high compared to the national unemployment rate of 3.6% (Razali, 2023). The mismatch between educational background and industry standards could have made it challenging for graduates to find fulfilling career prospects. Employers often sought specialized information, expertise and abilities related to the sector, which might not have been fully provided by academic institutions. The misalignment between industrial demands and academic success could have left graduates unprepared for the rapidly changing employment landscape. Closing this gap was crucial to reducing unemployment rates and providing students with better career opportunities aligned with their educational levels.

This study explored how attitude, subjective norm and perceived behavioural control collectively impacted bachelor students' awareness of data analytics course in the East Coast of the Peninsular Malaysia. Understanding how these elements worked together to influence students' perception of data analytics courses was essential for addressing issues related to career possibilities, unemployment and academic performance. The study's findings might have offered educational institutions and policymaker's valuable insights on how to better align the curriculum with industry demands, reduce unemployment rates and encourage students to pursue more promising career paths in the region. Universities played a crucial role in producing graduates capable of meeting the needs of the then-current job market (Mohamed et al., 2022). Therefore, the problem statement for this study was to what extent did attitude, subjective norm and perceived behavioural

collectively shape data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.

1.3 Research Question

This study explored the following research questions:

- What is the relationship between attitude and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia?
- What is the relationship between subjective norm and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia?
- What is the relationship between perceived behavioural control and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia?

1.4 Research Objectives

The primary objectives of this research project were as follows:

- To determine the relationship between attitude and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.
- To understand the relationship between subjective norm and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.
- To analyze the relationship between perceived behavioural control and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.

1.5 Scope of the Study

Determining this study's scope was crucial to ensuring the research effort was practical and targeted. The scope set the boundaries of what was investigated and helped in managing the research effectively. The scope of this research encompassed the following key aspects:

- Geographical Scope

The East Coast of the Peninsular Malaysia, which includes the states of Kelantan, Terengganu and Pahang, was the sole subject of the research. To guarantee a localized viewpoint, data collection and analysis were restricted to this particular location.

- Demographic Scope

The study's target population was bachelor's degree candidates enrolled in various academic programs at East Coast of the Peninsular Malaysia universities. The sample included students from different backgrounds (gender and age), program of study, year of study and educational institutions within the region.

- Time Frame

The research spanned the time period of the academic year 2023/2024. This deliberate timeline ensured not only the acquisition of up-to-date knowledge among the target demographic but also allowed for a thorough understanding of any seasonal variations that could potentially influence the factors being investigated.

- Key Factors

Three main aspects were the focus of the study, namely attitude, subjective norm and perceived behavioral control in relation to data analytics course awareness among bachelor students. It investigated how all of these elements affected those students' awareness on the East Coast of the Peninsular Malaysia.

- Data Collection Methods

The research used a quantitative research approach, focusing on collecting data primarily through an online questionnaire using Google Forms. The survey link was disseminated through internet platforms and social media channels to reach bachelor students in the East Coast of the Peninsular Malaysia.

1.6 Significance of Study

The possible importance, relevance or influence of the research findings was referred to as the study's significance in the scientific community. It made clear why the study was important by outlining how it filled in knowledge gaps, advanced beneficial improvement and informed decision-making. Additionally, it drew attention to the research's significant and useful contributions within its particular setting, emphasizing its potential to influence positive changes in educational practices and contribute to the regional development of the East Coast of the Peninsular Malaysia.

- Addressing a Local Educational Challenge

The study was highly crucial for the East Coast area of the Peninsular Malaysia because bachelor students' knowledge and comprehension of data analytic courses were essential to the region's educational environment. This study addressed a particular educational issue that impacted nearby students and institutions by examining the elements that influenced awareness.

- Academic and Career Advancement

The study's conclusions improved bachelor's degree candidates' academic performance in the area. It created customized awareness programs and curricula by having a thorough

understanding of the elements that influenced students' awareness of data analytics courses. Students' academic and career prospects were enhanced by this since it provided them with industry-relevant skills and information.

- **Reduction of Unemployment Rates**

In many areas, high rates of unemployment among recent graduates were a serious problem. By analyzing the variables influencing data analytic course awareness, this study sought to close the knowledge gap between industry requirements and academic accomplishments. The study lowered unemployment rates and increased graduates' chances of fulfilling work by raising awareness and matching educational programs with industrial demands.

- **Empowering Students for Industry 4.0**

A trained workforce was necessary for the Fourth Industrial Revolution, which was characterized by cutting-edge technology and data-driven decision-making. In the world of Industry 4.0, equipping students with the knowledge and abilities required for data analytics was essential to the region's progress. The results of this study aided educational institutions in better preparing students for this sector of the economy, hence enhancing the competitiveness and expansion of the area.

- **Policy Implications and Curriculum Enhancements**

The goal of the study was to offer practical advice to educational institutions and decision-makers so they could create awareness campaigns and data-analytics courses that met the demands of East Coast of Peninsular Malaysia students. These policy ramifications resulted in curriculum improvements, public awareness campaigns and other efforts to raise the standard of education and job prospects in the area of Kelantan, Terengganu and Pahang state.

- Contribution to Research Literature

The study added to the body of knowledge about the variables impacting bachelor students' understanding of data analytics courses. In addition to being a useful resource for academics, researchers and educators interested in the fields of data analytics and educational awareness, it may be used as a reference for future studies.

1.7 Definition of Term

Definition of term is a statement that defines the core aspect of something, allowing for a shared understanding of crucial terms in the improvement of a problem. Below are showing the definition of term.

- Data Analytics

The act of evaluating, cleaning, controlling, and analysing data to identify useful information, make conclusions and improve decision-making is known as data analytics. It entails a variety of strategies and tools for gaining insights and information from organized and unstructured data. Data analytics is the application of techniques and tools to analyze and understand raw data in order to provide actionable insights (Chen, H. et.al, 2012).

- Data Analytics Course

This course through digital networks and software, educators may monitor and analyze the development of each student at various phases of the educational cycle. More immediate and genuine evaluation of learning objectives provides students with a one-of-a-kind learning experience, enhancing learning effectiveness by allowing people to reflect on their specific knowledge and practise (Surajit, 2020).

- Awareness

Data Analytic Course Awareness is frequently characterized as a person's or organization's ability to fully understand and make intelligent choices of study course with based on data analysis. It entails being aware of the significance of data, comprehending the methodologies and tools used in data analysis and being able to evaluate and generate useful insights from data (Chen, H. et.al, 2012).

- Attitude

This is the level at which a person judges a person's interest's good or bad behaviour, taking into consideration the consequences of participation in the behaviour. Attitude is a psychological term that describes a person's overall assessment of a certain item, person, group, issue or circumstance (LaMorte, 2022). Attitudes are made up of emotive, cognitive and behavioral components that impact how people perceive and respond to diverse stimuli (Eagly, A. H., et. al., 1993).

- Subjective Norm

The subjective norm is a person's view of the societal expectations to engage in a specific behaviour. Subjective norms are influenced by a person's normative views and motivation to comply. Normative views are concerned with the possibility that important others will approve or disapprove of a behaviour, whereas motivation to comply is an appraisal of the importance of having the approval of important others (Ajzen, 2020).

- Perceived Behavioural Control

Motivating factors that impact a certain perceived behavioural control, where the stronger the intention to execute the behaviour, the more likely the behaviour will be completed (LaMorte, 2022). Subject that someone does is commonly referred to as their behavior.

Something that a person does that is observable and quantifiable is referred to as behavior. It is usual to describe behavior by distinguishing which activities the individual has demonstrated or which behaviors the instructor believes the individual should begin to demonstrate (Hiscock R., 2020).

- Bachelor Students

A bachelor's degree, often known as a bachelor's student is a student who receives a bachelor's academic degree from a college or university after completing a three to six year course of study (depending on the institution and academic subject). Malaysian institutes of higher learning provide three or four years of education culminating in a BSc Hons Degree. Malaysian universities use virtually identical classification norms (Wikipedia, 2023). Certain bachelor's degrees are only available as graduate or post-graduate study in particular institutions and education systems after the initial degree has been completed.

- East Coast of the Peninsular Malaysia

The East Coast of the Peninsular Malaysia (ECPM) borders the South China Sea and faces the Sunda Platform's continental shelf. Its climate follows a cyclical cycle, with the Northeast Monsoon and the Southwest Monsoon occurring between November and March (Ibrahim et al., 2000). The states participating in this area include Pahang, Terengganu and Kelantan.

1.8 Organization of the Proposal

In Chapter 1, this chapter covered essential elements such as an introduction, study background, problem statement, research question, research objectives, study scope, significance, terminology

definitions, and the proposal's structural outline. Chapter 2 will conduct a thorough literature review of relevant publications and considered articles, exploring underlying theories, previous research, hypothesis statements, conceptual frameworks, and summarizing the findings. Chapter 3 will delve into research design, data collection methods, study population, sample size, sampling methodology, instrument development, variable measurement, data analysis processes and provide a research summary for this study. In Chapter 4, the research presents data analysis and findings, encompassing preliminary analysis, demographic profiling, descriptive analysis, validity and reliability tests, normality tests and hypothesis testing. Finally, Chapter 5 delves into the discussion and conclusion of the research, addressing key findings, hypothesis discussion, implications, study limitations, recommendations, suggestions for future research and an overall conclusion.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, the underlying theory that applied in this study is discussed. The literature review on the dependent variables, data analytics course awareness among attitude, subjective norm (SN) and perceived behaviour control (PBC), and it is also presented in Chapter 2. Aside from that, this chapter will go into the study's conceptual framework as well as the hypothesis statement.

2.2 Underpinning Theory

The Theory of Planned Behavior is a psychological theory that references beliefs to behavior. According to the idea, three basic components define an individual's behavioural intentions including attitude, SN and PBC (Ajzen, 1991). The TPB was expanded by incorporating PBC, which represents how an individual perceives themselves and their ability to achieve certain actions (Strydom, 2018). PBC influences behavior performance and the reason to act, affecting both the purpose and actual behavior. The use is critical for academics based on environmental factors that influence an individual's behavior. Figure 2.1 shows the framework of Theory of Planned Behavior (TBP) which includes attitudes, SN and PBC (Ajzen, 1991).

Although the framework shows that attitude, SN and PBC are used to see the relationship with intention, there are some other studies that use it to study the relationship with awareness. For example, there is a study published in 2020 using the TPB to study awareness and the title of the study is "Factor That Affect the Level of Awareness among Malaysian toward the COVID-19 Pandemic: A Structural Equation Modeling Approach" (Sarkam, Jamal, Hasan and Jamil, 2020).

Their research aimed to assess the factors that influenced the level of awareness toward COVID-19 among Malaysian by measuring attitude, subjective norm and perceived behavioural control (PBC) using an online survey. Therefore, the Theory of Planned Behavior (TPB) is used for this study.

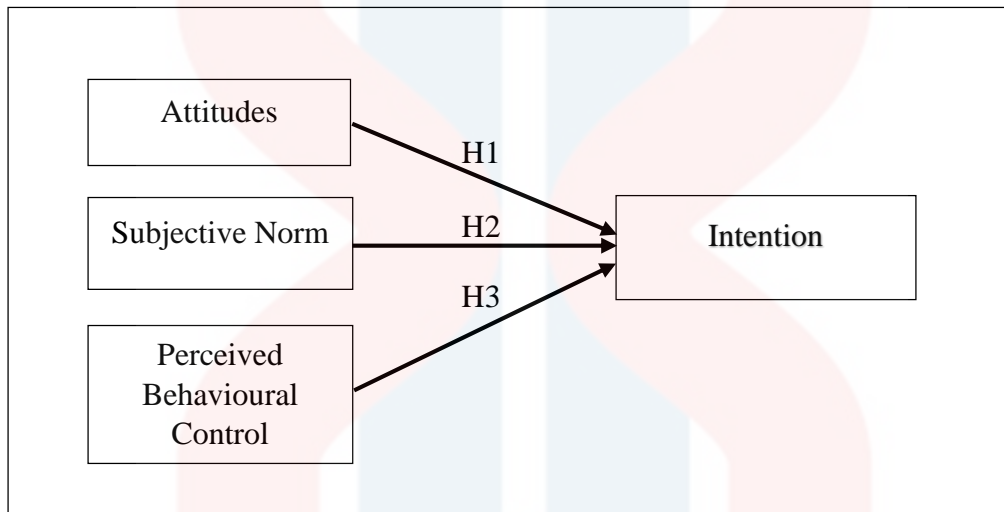


Figure 2.1: Theory of Planned Behavior (TPB)

(Source: Ajzen, 1991)

According to TPB, the amount individual’s an opinion or appraisal that is favorable or unfavorable to doing the target behavior is referred to as attitude towards behavior. A behavioral attitude is also a conviction in the prospective outcome or quality of another activity (Ajzen, 2020). So that, in this study, the behavior of attitude is applied to investigate the person attitude on data analytics. In the TPB model, SN is presented as the second feature of behavioural intention. SN are the opinions of individuals near to a person who impact their conduct such as close friends and family, coworkers and collaborators in business (Han et al., 2010).

The third feature of TPB is perceived behavioral control (PBC). This refers to a person's sense of the ease or difficulty of engaging in an interest-based behaviour. PBC changes between situations

and activities, therefore a person's judgements of behavioural control depend on the context (Ajzen, 2020). The TPB was expanded by integrating PBC, which represents how it views themselves. Indicators of "available resources and opportunities" as well as perception or "confidence in their ability to achieve" certain actions (Strydom, 2018). A person's assessment of his capacity to conduct behaviour - how simple or difficult it is to finish an activity - influences behaviour performance in addition to the reason to act. As a result, the PBC influences not just purpose to behave, but also actual behaviour.

2.3 Previous Studies

This review aims to study a specific issue, data collection method, and formulate simulations based on the discovered insights. Previous studies serve as a valuable resource for academics delving into questions associated with the focal issue. Various rationales exist for the reliance on prior research.

2.3.1 Attitude

According to the previous study, the degree to which an individual has a good or negative view or judgement of doing the desired behaviour is referred to as attitudes. (Nur Shafaeera et al., 2022). Attitudes are prospective outcomes or characteristics of other activities which is the concern, sensitivity and the responsibility of this research topic. Also in this it described as a person, it can be a favourable or negative psychological emotion about a person's actions. A positive attitude has been found to be highly related to commitment to a specific behaviour. Human capital refers to the information, skills and attitudes necessary to achieve bachelor students' performance goals

in this data analytics course. Human capital, as described, is a set of elements that impact a person's professional growth, such as age, education, cognitive ability, emotional intelligence, and job experience (Fugate et al., 2004).

Furthermore, according to the study the dimension involves the usage of the idea of ownership, which is the attitude and qualities of graduates who are considered as capable of being owned and utilised, as well as expertise and work-related attitudes. Combining the perspectives of many academics, it has been demonstrated that human capital refers to the talents, job expertise, work experience, knowledge, skills, and attitudes that a person must have in order to properly execute the use and breadth of analytical data and awareness. The majority of individuals have not been able to translate their knowledge into commitment, and more people have a negative attitude towards the environment. They established a link between attitude consciousness and consciousness. The attitude of a person is significant because it indicates how they encounter and apply the knowledge they learn (Holmes, 2013).

2.3.2 Subjective Norm

SN are offered as the second prediction of behavioural intention. In other words, SN are the opinions of individuals near to a person who impact their conduct such as close friends and family, co-workers and collaborators in business (Han et al., 2010). (Ajzen, 2020) explained that SN could be built by normative beliefs (namely, trust in others) and motivation to comply (namely, one's desire to obey people around them). Normative beliefs are concerned with the likelihood that important others would approve or disapprove of a behaviour, while motivation to comply is an assessment of how important it is to have approval of important others (Ajzen, 1991). Each normative belief about an important other is multiplied by the person's motivation to comply with

that important other and the products are summed across all of the person's important others to result in a general measure that predicts SN. For example, (LeBon, 1895) documented an effect he called contagion, that people in a crowd are strongly affected by the beliefs, emotions and behaviours of others in that crowd. Motivation to comply is motivation to do what salient referents think an individual should do or contributes to SN along with normative beliefs.

Professional knowledge, student attitudes and the learning environment all play a role in developing bachelor students' lifelong learning skills. Indeed, it has been established that the better prepared a person is for lifelong learning, the more educated and knowledgeable they are. In the ever-changing expansion of data analytic, people must be eager to study new concepts and data analytic courses, as well as continually better themselves by utilising sophisticated information and networks. This type of continual professional growth is seen as a crucial component of the ability to learn for life (Nicole et al., 2012). Furthermore, these individuals are extremely creative and frequently create a broad range of unique objects in their studies and employment. All of this helps to one's personal and professional development.

2.3.3 Perceived Behavioural Control

The PBC influences not just purpose to behave, but also actual behaviour. (Ajzen, 2020) explained that PBC could be built by control beliefs (namely, several factors supporting an action/behaviour) and perceived power (namely, one's strength related to the factors that support the behaviour). Perceived power refers to an individual's perception of their ability to perform a behaviour and the resources available to them. If someone believes that they have the necessary skills and resources to exercise regularly, they will have a positive perceived power, which can influence their behavioural intentions and result in actual behaviour change. Perceived power contributes to a

person's PBC over each of those factors (Wayne W, 2022). Control beliefs reflect the degree to which an individual believes that he or she has control over their intellectual competence necessary to bring about desired outcomes, including those associated with aging. Control belief about learning concerns how much perceived control one has to accomplish positive and desired outcomes. Perceiving internal control tends to increase persistence and expectations for attaining goals. Conversely, attributing control to external factors such as teachers, may lead to lower expectations of achievement (Azjen, 2020).

Based on the past research, people's perception of their ability to do various activities, and research and learn new things. The ability to perform a behavior is determined by a person's opinion of their ability to perform their character. Either behave well or not. The disclosure of analytical data in previous studies refers to the extent of their sensitivity to the issue and awareness of this analytical data among bachelor students (Wayne, 2022). At a certain age or generation Z itself, only a few are really aware of the existence and convenience of analytical data for future use and career as well as the opportunity to start a business among them. This behavior needs to be emphasized and need to be clearer among bachelor students based on previous studies (Wayne, 2022).

2.3.4 Awareness

According to previous research, researchers was suggesting that knowledge of big data analytics and context-aware computing are required technologies for the future operation of sustainable smart cities. This is due to the fact that the effect supports each other's efforts to add a new dimension to the process of controlling and organizing urban life. Also, in terms of advancing sustainability through the use of various forms of big data and context-sensitive apps (Simon E. B., 2018). Allocation heuristics alert the user to the fact that the suggested energy also allocates

data centre resources to customer applications in a way that enhances data centre energy efficiency while achieving the stipulated Quality of Service (Anton B. et. al., 2011). According to previous research, understanding of the use of analytical data in this course is critical in aiding learning and for student usage.

2.3.5 Data Analytics Course

Data analytics is one of the most advanced forms of analytics, involving the use of algorithms, machine learning, and computer modelling processes. Effective use of prescriptive analytics, on the other hand, may have a substantial impact on a company's decision-making process and, eventually, on the bottom line (Emily S., 2023). Data analytics is actively employed in the business and is becoming a necessary ability in the employment market. This cost is essential to learn and employ in the context of work. However, by utilising data analytics where appropriate, student should be able to focus on their professional abilities (Nurmiera, 2022).

Students specializing in subjects linked to data science, computer science, statistics, business, economics, and engineering are frequently more aware of data analytics courses. They are more likely to be introduced to data analytics concepts and may seek out such courses on their own. Data sensing, information processing, and networking technologies are rapidly being incorporated into the fabric of modern cities, enabling the deployment of creative solutions to solve sustainability and urbanisation challenges. The new digital transformation in ICT has accelerated this (Nurmiera, 2022). Also based on this research, there are various colleges that provide data analytics courses. The University of Pennsylvania, for example, offers a course called Business Analytics: From Data to Insights. Universities that provide distinctive certificates to students who successfully complete their studies in the field of study (Wharton, 2023).

2.3.6 Bachelor Programme

Bachelor programs, including both regular and honours options, require more than a simple pass for completion. Some universities may necessitate additional years for an Honours degree. The standard duration for bachelor's programs typically spans from 3 to 5 years. Individuals aged 19 and older can apply for a variety of courses offered within bachelor programs. Malaysian higher education institutions offer a diverse range of undergraduate courses in areas such as Agriculture, Art, Design & Music, Aviation & Maritime, Business & Administration, Computer & Technology, Construction, Education, Engineering & Technical Skills, Hospitality & Tourism/Food & Beverage/Culinary, Science & Mathematics and more, as outlined on the website (Malaysianeducation.info, 2023).

The bachelor's degree program emphasizes the exploration of techniques, tools, and methodologies (Keystone Bachelor Studies, 2023). Previous research has extensively delved into various aspects among bachelor student, with one notable area being related to time management. Indeed, the challenge of time management significantly impacts college students transitioning into the workforce. Effectively managing time requires individuals to develop strategies to perform and handle their responsibilities adequately (Rafiq, 2004).

2.4 Hypothesis Statement

Hence, a hypothesis can be characterized as a collection of statements proposed to elucidate the occurrence of a particular phenomenon. Based on the details provided in the article, a correlation has been identified between the awareness of data analytics among bachelor students on the East Coast of the Peninsular Malaysia (ECPM). To explore this relationship, three hypotheses have

been formulated, aiming to examine the correlation between the dependent variable (awareness of data analytics courses) and three independent variables (attitude, SN and PBC).

- Hypothesis 1 (H1): The relationship between attitude and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.
- Hypothesis 2 (H2): The relationship between subjective norm and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.
- Hypothesis 3 (H3): The relationship between perceived behavioural control and data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia.

2.5 Conceptual Framework

Based on the previous studies, this research proposed the conceptual framework based on the TPB model (Ajzen, 1991). The Independent Variable (IV) and Dependent Variable (DV) that were used in this study were purposed in Figure 2.2. The conceptual framework was extended from the intricate interplay of three pivotal factors attitude, SN, and PBC, all intricately linked to the data analytics course awareness. Each of these variables illustrated a complex web of relationships with one another. The IV under investigation has been developed. The first being the IV of attitude, encompassing characteristic behavioral control and evaluation. The second involves subjective norm, which include characteristic normative beliefs and motivation to comply. Finally, the third IV comprises perceived behavioural control, encompassing control beliefs and perceived behavior (Zetrahnam, 2023). It reflected a deliberate choice by researchers to ensure that the theoretical underpinning harmonized with the study's purpose. The conceptual framework was illustrated in Figure 2.2.

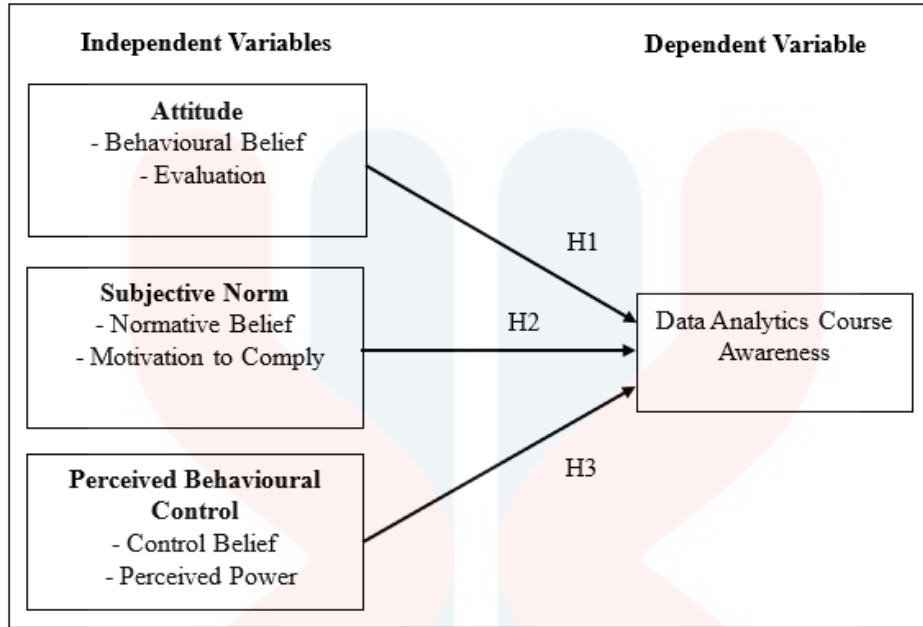


Figure 2.2: The Conceptual Framework

2.6 Summary

Within this chapter, a comprehensive exploration of the determinants influencing awareness of data analysis within the bachelor students was delved into, drawing upon reference articles and thorough reviews of relevant literature. The theoretical framework was developed based on the TPB, encompassing attitude, SN, and PBC. In a previous study, a detailed explanation of the independent and dependent variables, along with the hypotheses derived from their relationships, was provided. Hence, the dependent variables in this research related to the awareness of the data analytics course, with attitude, SN, and PBC serving as the independent variables. Finally, the subsequent chapter offered a more detailed explanation of the methodology and techniques employed in this research.

CHAPTER 3

RESEARCH METHODS

3.1 Introduction

The focus of the methodology was to enhance the credibility of the research by ensuring transparency and reproducibility in the approach, as emphasized by (Chris, 2021). The researcher delved into aspects such as research design, approaches to data collection, characteristics of the study population, size of the sample, techniques used for sampling, creation of research instruments, and the assessment of data analytics. This involved the identification of respondents and the evaluation of gathered information. The study adopted a quantitative design, which involved the collection of numerical data and the application of mathematical analysis to observe trends, make predictions, conduct experiments, and test hypotheses, as highlighted by (Chris, 2021).

3.2 Research Design

The research design encompassed a comprehensive strategy and analytical methods selected to effectively connect various study components, ensuring a thorough exploration of the research problem (Vaus et al., 2001). Researchers employed different methodologies like surveys, experiments, or interviews depending on their research objectives. In a thesis, dissertation, or research paper, the methodology chapter delineated the procedures undertaken, enabling readers to assess the research's reliability and validity (McCombes, 2022).

In this study, quantitative method was adopted for data collection and analysis, involving gathering numerical data, conducting mathematical analyses, making predictions, experimenting, and testing

hypotheses (Chris, 2021). Our research followed a deductive scenario, starting with a theory or hypothesis and verifying it through observation (Anonymous, 2023). Precisely, this study utilized deductive research with bachelor students to delineate the connection between specific variables, aligning with our research objectives.

3.3 Data Collection Methods

In this study, approaches to collecting data encompassed the techniques and procedures employed to acquire information for research, as articulated by (Bhat, 2023). The researcher relied on primary data, which denoted firsthand information gathered directly conducted by the investigator, as explained by (Wagh, 2023). The primary data collection approach in the context of this study involved a questionnaire designed using google form. This google form was distributed to Bachelor students through WhatsApp, Telegram, Instagram and TikTok to collect the necessary primary data, targeting approximately 400 bachelor students in the East Coast of the Peninsular Malaysia.

3.4 Study Population

The term population denoted the complete set of people, objects, or events under investigation, where as a sample represented a portion of the overall population utilized for analysis, as clarified by (Ravikiran A S, 2023). Consequently, the focus population for this research comprised bachelor students enrolled in Kelantan, Terengganu, and Pahang. This research was important since it focused on specific locations. The population stated was approximately 90,043 students in the year 2022, taken from the (KPT, 2022).

3.5 Sample Size

Table 3.1
Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384

Note: N is Population Size; S is Sample Size Source: Krejcie & Morgan, 1970

Source: Krejcie & Morgan (1970)

Figure 3.1: Determining Sample Size of a Known Population

In any statistical scenario, such as a public opinion poll or questionnaire, sample size is a count of individual samples or observations. Though a simple notion, selecting a sample size is an important decision for every project. A small sample gave erroneous findings, whereas a big sample necessitated a significant amount of effort and time. When conducting research and publishing results, sample size, or the number of study participants, is critical in determining the validity and application of a study's findings. Presenting sample size is a very fundamental element in the complete investigation when delivering the results (Maleske, 2023). The sample size has a major influence on the dependability of study findings and their potential to be generalized to a larger population, making it an important element to consider. In this research, 400 bachelor students on

the ECPM were the sample size to represent the whole population. According to the Figure 3.1, for the population size is between 75000 until 1000000, so the sample size is 382 (Krejcie, 1970). Therefore, the sample size of this study is 400 and qualified to the population size. Figure 3.1 showed determining the sample size of a known population.

3.6 Sampling Techniques

The sampling in this research, researchers used the non-probability sampling techniques which are convenience sampling and snowball sampling. Researchers chose participants for convenience sampling, sometimes referred to as availability sampling, using a non-probability selection technique that took accessibility and availability into consideration. Convenience sampling techniques were frequently used because they were easy to use and practical, as participants were chosen based on convenience rather than through random or systematic methods (Simkus, 2022).

Then, snowball sampling was one of the non-probability sampling methods that depended on first-time participants' recommendations to bring in new participants. Starting with a small group of participants who satisfied the inclusion criteria, the researcher asked them to recommend additional people who also matched the study requirements. This approach had the benefit of finding samples more quickly. When the target population was hard to reach or didn't have a large enough sample size, this technique was very helpful (Nikolopoulou, 2022).

Each sampling technique had its own advantages and considerations. The technique of sampling used was determined by the research goals, available resources, and characteristics of the population under study (Amadebai, 2021). It was crucial to carefully consider the advantages and limitations of each technique and select the most appropriate one to ensure the sample represented

the target population to the best possible extent. In this research, the researchers used convenience sampling and snowball sampling. By employing suitable sampling techniques, the study could gather data from a diverse range of participants to ensure the study effectively uncovered the key factors influencing data analytics course awareness among bachelor students on the ECPM.

3.7 Research Instrument Development

This research instrument was used as a questionnaire, including questions on the research's objectives and variables (Jessca, 2020). The research instrument, typically a questionnaire in this research, is designed to gather information from bachelor students on the ECPM regarding their awareness of data analytics courses and the key factors that may influence this awareness.

This questionnaire has 4 sections. The demographics of the respondents, including gender, program of study, age, year of study, and location, were listed in Section A. In Section A, there were five questions. The type of measurement scale in Section A is nominal scale and ordinal scale.

Section B contained general questions for the respondents. Section B has three questions. The type of measurement scale in Section B is nominal scale. The lowest measuring level is the nominal scale, entailing classifying information into unique, non-overlapping labels or categories (Zatt, 2018).

Next in Section C, questions were related to the independent variables and included SN, attitude, PBC. There were nine total questions in Section C. Section D covered the dependent variable, which is data analytics course awareness. There were three total questions in Section D.

In Sections C and D of this research, researchers employed an ordinal scale which is Five- point Likert Scale to gauge respondents' attitudes, SN, PBC and data analytics course awareness. A technique for evaluating respondent responses based on the five levels, which is strongly disagree, disagree, neutral, agree, and strongly agree (Croasmun et al., 2011). Table 3.1 showed the items of the questionnaire.

Table 3.1: Items of the Questionnaire

Section	Variables To Be Identified	No. of Item	Total of Item	Source
A	Demographic Profile A1. Age A2. Gender A3. Programme A4. Year of Study A5. Location	A1-A5	5	Clint Fontanella (2022)
B	General Question B1. Have you ever taken a data analytics course like Excel as part of your studies? B2. Have you received guidance from data analytics courses such as Excel and Google Analytics? B3. Are you aware of any career opportunities related to data analytics in your region?	B1-B3	3	Bernardita Calzon (2023)
C	Independent Variable (IV) • Attitude C1. I believe acquiring skills in Microsoft Excel application would positively impact my academic coursework and research projects. C2. I evaluate the importance of Microsoft Excel application skills in enhancing academic coursework and research projects.	C1-C9	9	Zetrahnamy (2023)

C3. I positively evaluate the necessity of managing Microsoft Excel application among bachelor students.

- Subjective Norm

C4. I believe the influence of peers is important in shaping awareness of data analytics courses.

C5. I find strong motivation to consider family and friends' expectations when deciding on data analytics courses.

C6. I found that my family's expectations were a key factor in shaping my perspective on data analytics courses.

- Perceived Behavioural Control

C7. I believe that integrating Microsoft Excel application in academic activities is within my control.

C8. I perceive myself as powerful in organizing and comprehending data using Microsoft Excel application in academic tasks.

C9. I believe that possessing Microsoft Excel application skills empowers me for future career opportunities.

D	Dependent Variable (DV)	D1-D3	3	Zetrahnam (2023)
	<ul style="list-style-type: none"> • Data Analytic Course Awareness <p>D1. I am highly knowledgeable of data analytic courses offered at my university</p> <p>D2. I have a strong understanding of the benefits of taking data analytic courses for my academic and career development.</p> <p>D3. I'm aware of the content and potential career opportunities associated with the data analytics course at my university.</p> <p>Total</p>		20	

3.8 Measurement of the Variables

Variables were often used in research to obtain accurate results. This was accomplished by adjusting, measuring, and manipulating variables. The type of analysis to be carried out depended critically on the measuring method the researcher used. Nominal, ordinal, interval, and ratio level measurements were available for researchers to use (Zach, 2020). The nominal scale and ordinal scale were the two measuring variables used in this research.

3.8.1 Nominal Scale

The lowest measuring level was the nominal scale. It entailed classifying data into unique labels or categories that did not overlap. Nominal measurement used categories to indicate distinct groups, but these categories had no intrinsic numerical value, ranking, or order (Zatt, 2018). The questionnaire was the most common way for collecting data on a nominal scale. In this research, section A and section B used a nominal scale. The demographics of the respondents, including gender, program of study, age, year of study, and location, were listed in Section A. Section B contained general questions for the respondents. Table 3.2 showed the example of the nominal scale.

Table 3.2: The Attribute with Nominal Scale

Item	The type of measurement scale
Gender	Nominal scale
Programme of study	Nominal scale
Year of study	Nominal scale
Location	Nominal scale
General question 1	Nominal scale

General question 2

Nominal scale

General question 3

Nominal scale

Source: Guitargeek (2012)

3.8.2 Ordinal Scale

When using an ordinal scale, data had to be sorted into ordered categories where the sequence indicated a meaningful sequence but where the differences between the categories were not always consistent or quantifiable. In ordinal measurement, you could rank the categories based on the attribute being measured, but you couldn't determine the exact magnitude of differences between them (Zatt, 2018). In section C, which was related to the independent variable and included SN, attitude, and PBC, and Section D, which was the dependent variable data analytics course awareness, researchers used an ordinal scale such as a 5-point Likert scale to collect data. Researchers could clearly rank the categories from strongly disagree, disagree, neutral, agree and strongly agree. Table 3.3 showed the Five-Point Likert scale that applied in the questionnaire.

Table 3.3: Five-Point Likert Scale

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Source: Saul Mcleod (2023)

In research, the measurement of variables was essential for making data collection and analysis more objective and rigorous (Taherdoost, 2022). The measurement of variables in this research was critical for understanding how attitudes, SN, PBC, demographics, and other factors were

related to students' awareness of data analytics courses, ultimately enabling researchers to draw meaningful conclusions about the key influencing factors in the research.

3.9 Procedure for Data Analysis

In this research, 400 respondents were collected from bachelor students on the ECPM. 400 respondents were completed the questionnaire via a google form and all the data were subsequently evaluated using the Statistical Package for Social Sciences (SPSS) and Structural Equation Modeling Partial Least Squares (SmartPLS). In this study, the researchers employed both SPSS and SmartPLS as tools for evaluating the data.

SPSS offered a range of advantages for researchers in various fields. Because of its clear interface, data analysis was made easier and more accessible to researchers with different degrees of statistical SN (Amico et al., 2001). SPSS Automation and batch processing features saved time and reduced errors, especially when working with large datasets. SPSS software also sped up data collection and quantitative analysis. SPSS was used to analyze the acquired data as it ensured excellent analysis. Data was collected, analyzed, and summarized in an easy-to-understand format for tabulation and interpretation.

SmartPLS is a user-friendly statistical tool widely used for structural equation modeling analysis. SmartPLS stands out due to its user-friendly interface and strong capabilities, making it accessible to researchers with diverse levels of statistical expertise. One of its key advantages is its suitability for smaller sample sizes, providing robustness in scenarios where data may be limited. The software supports both reflective and formative measurement models, offering flexibility in modeling approaches (Memona, 2021).

In this study, researchers also have employed pilot test to assess the feasibility and effectiveness of the research methodology and tools before the full-scale implementation. Specifically, it helps identify potential issues with the questionnaire, understand respondent reactions, and ensure that the selected statistical techniques are suitable for the dataset. The pilot test is crucial for refining the survey instrument, addressing any ambiguities or confusion in the questions and ensuring that the research process is sound. Ultimately, the pilot test contributes to the overall validity and reliability of the study by allowing researchers to make necessary adjustments before conducting the main data collection (Kuhn, 2023).

3.9.1 Descriptive Statistics

Descriptive statistics were a numerical and graphical approach used to describe, analyze, and show important elements of data related to the awareness of data analytics courses among bachelor students. Descriptive statistics were used to correctly define the fundamental properties of the study data. They provided an instant summary of samples and data in a concise format. They were the backbone of every quantitative data analysis and the basis for simple and clear data presentation.

These statistics offered a comprehensive picture of the core trends, variability, and distribution of variables such as awareness, SN, and attitudes. They helped researchers understand and communicate the essential features of the data, aiding in the initial exploration of the factors influencing data analytics course awareness. Descriptive statistics included mean, median, mode, range, and standard deviation values, as well as graphical representations such as bar charts, histograms, and box plots (Hassan, 2023). They played a fundamental role in summarizing and

presenting the key data points and characteristics in the research, setting the foundation for more in-depth analysis and interpretation.

3.9.2 Reliability Analysis

Reliability analysis referred to a statistical procedure used in research to assess the consistency, stability, and dependability of measurement instruments or questionnaires (Middleton, 2023). In the context of the researcher's study titled Determination of Key Factors Influencing Data Analytics Course Awareness among Bachelor Students in the East Coast of the Peninsular Malaysia, reliability analysis was essential for evaluating and determining the reliability of the instruments or questionnaires used to measure various factors related to data analytics course awareness among bachelor students. Reliability referred to whether the results obtained by using an instrument multiple times were consistent (Taber, 2017). Table 3.4 showed the coefficient ranges of Cronbach's Alpha and reliability level.

Table 3.4: Coefficient Ranges of Cronbach's Alpha and Reliability Level

No	Coefficient of Cronbach's Alpha	Reliability Level
1	More than 0.90	Excellent
2	0.80-0.89	Good
3	0.70-0.79	Acceptable
4	0.6-0.69	Questionable
5	0.5-0.59	Poor
6	Less than 0.59	Unacceptable

Source: Arof, K. Z. M., Ismail, S., & Saleh, A. L. (2018)

3.9.3 Pearson Correlation

Pearson Correlation was a statistical measure that measured the strength and direction of a linear connection between two continuous variables. It was also known as Pearson's correlation coefficient or Pearson's r . It measured the degree to which changes in one variable were related to changes in another (Bhandari, 2021). The Pearson correlation assessed the degree to which the relationship between two variables could be described by a straight line. In other words, it measured how well the relationship between the variables could be approximated by a linear equation ($y = mx + b$).

Pearson correlation yielded a value ranging from -1 to 1. The absolute value of the correlation coefficient indicated the strength of the relationship. A value closer to 1 (either positive or negative) suggested a stronger linear association, while a value closer to 0 indicated a weaker association. Pearson correlation was widely used in various fields, including social sciences, economics, biology, and more. It helped researchers and analysts understand the nature and strength of relationships between two continuous variables. Table 3.5 showed the rule of thumb for interpreting the size of a correlation coefficient.

Table 3.5: The Rule of Thumb for Interpreting the Size of a Correlation Coefficient

The size of correlation	Interpretation
.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (-.00 to -.30)	Negligible correlation

Source: Yury Zablotzki (2022)

3.10 Summary

Chapter 3 described the research methodologies that were employed. The data for this research was gathered using quantitative research methodologies. When the number of target responders was big, this strategy was well suited. The data for this research was gathered via a questionnaire. The researcher relied on primary data. The primary data collection approach for this research involved a questionnaire designed using Google Form and targeted approximately 400 bachelor students in the ECPM. Next, the primary tool used was the Statistical Package for Social Sciences (SPSS). As for sampling in this research, researchers used the non-probability sampling techniques which were convenience sampling and snowball sampling. By employing suitable sampling techniques, the study could gather data from a diverse range of participants, ensuring the study effectively uncovered the key factors influencing data analytics course awareness among bachelor students on the East Coast of the Peninsular Malaysia. After that, the nominal scale and ordinal scale were the two measuring variables used in this research. The research methods chosen were instrumental in shedding light on the complexities surrounding data analytic course awareness, offering a solid foundation for future studies and potential interventions to enhance awareness levels among bachelor students in the region.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents on the findings of the study. It describes about preliminary analysis, descriptive analysis, validity and preliminary analysis test, normality test and hypotheses testing.

4.2 Preliminary Analysis

Preliminary analysis is present pilot test that verify the reliability of measures, evaluating the effectiveness of any manipulations, examining the distributions of individual variables and identifying outliers are all examples of preliminary analyses on any data set by (Paul, 2017). In this study, number of respondents are 400 that focused on bachelor students in the East Coasts of the Peninsular Malaysia (ECPM). In this study, we take 10% of 444 respondents that will be pilot tested. According to Connelly (2008), extant literature suggests that a pilot study sample should be 10% of the sample projected for the larger parent study. So, the pilot test had a total of 44 respondents. It is means the pilot test is a valuable step in the research process, helping researchers enhance the quality of their study and increase the likelihood of obtaining valid and reliable results (Simkus, 2023). Table 4.1 shows the result of the pilot test of each variable.

Table 4.1 describes that a value greater than 0.7 scores is generally considered good, excellent and indicative of acceptable internal consistency in Cronbach's alpha (Frost, 2022). The highest Cronbach's Alpha is data analytics course awareness among bachelor student's variable which is 0.900 scores and the second highest is 0.893 scores of Cronbach's Alpha of perceived behavioural control (PBC) variable. The lowest Cronbach's alpha score is attitude variable which is 0.813

scores. Subjective norm (SN) variable is 0.845 scores. So, all of the variables in this study are considered good, excellent and indicative of acceptable internal consistency.

Table 4.1: Result of the Pilot Test

Variables	Cronbach's Alpha	No Items	Internal Consistency
Attitude → Awareness	0.813	3	Good
Subjective Norm → Awareness	0.845	3	Good
Perceived Behavioral Control → Awareness	0.893	3	Good
Data Analytics Course Awareness	0.900	3	Excellent

4.3 Demographic Profile of Respondent

Demographic analysis is the study of a population's characteristics such as age, race, and gender (Hayes, 30 September 2023). In this study describe about gender, age, programme, year of study and location. This research had 400 respondents who helped answer the questionnaire for the research project determination of key factors influencing data analytics course awareness in the ECPM. The research was conducted with bachelor students ECPM using an online survey created with Google Forms. All respondents have provided the essential demographic information. Table 4.2 shows the number of respondents follow by category for each group.

Table 4.2: Findings of Demographic Data

Parameter	N=400	Percentage (%)
Gender		
Male	146	36.5
Female	245	63.5
Age		
21 years old	75	18.8

22 years old	65	16.3
23 years old	103	25.8
24 years old	39	9.8
25 years old and above	118	29.5
Programme		
Science, Technology, Engineering and Mathematics (STEM)	106	26.5
Business and Management	113	28.2
Humanities and Social Sciences	35	8.8
Arts and Design	21	5.3
Others	125	31.3
Year of study		
Year 1	61	15.3
Year 2	85	21.3
Year 3	116	29
Year 4	138	34.5
Location		
Kelantan	161	40.3
Terengganu	115	28.7
Pahang	124	31

The highest number of respondents by the year of study is Year 4 which is 138 participants with 34.5%. Next, the higher number of respondents is Year 3 which is 116 participants with 29%. The lower number of respondents is Year 2 which is 21.3% and the lowest number of respondents is Year 1 with 61 participants and 15.3%. Lastly the location in ECPM the respondents were stay and study, for Kelantan was the highest with 40.3% and 161 participants, Pahang with 31% and 124 participants, while Terengganu is 28.7% with 115 participants.

4.4 Descriptive Analysis

The study has come out with the result to determine the mean for each variable for descriptive analysis. The result is called by using five Point Likert Scale where there is strongly disagree, disagree, neutral, agree and strongly agree. Table 4.3 shows the descriptive statistics analysis for dependent variable (DV) and independent variable (IV). It shows the mean and standard deviation of the respondent's response on the DV and IV according to the Five Likert Scale.

Among the three questions of data analytics course awareness, DV3 has the highest mean which is 3.70 and the standard deviation is 1.057. The second highest mean is DV2 which is 3.64 and the standard deviation is 1.076. The lowest mean is DV1 3.56 and 1.138 of standard deviation. For the attitude, the highest mean is IVA3 which is 4.09 and the standard deviation is 0.985. The second highest mean is IVA2 which is 4.02 and 0.981 of the standard deviation. The lowest mean is IVA1 which is 3.81 and 1.086 of the standard deviation.

Next is SN, which IVSN1 has the highest mean which is 4.17 and the standard deviation is 0.880. The second highest mean is IVSN3 4.06, and the standard deviation is 0.948. The lowest mean is IVSN2 which is 4.03 and 1.059 is the standard deviation. Furthermore, the highest mean for PBC is IVB3 which is 4.24 and the standard deviation is 0.902. The second highest mean is 4.18 of IVB2 and the standard deviation is 0.923. The lowest mean is IVB1 which is 3.88 and the standard deviation is 1.053.

Table 4.3: Descriptive Statistics

	N (Total Population)	Mean	Std. Deviation	Variance
IVA1	400	3.81	1.086	1.180
IVA2	400	4.02	.981	.962
IVA3	400	4.09	.985	.969

IVSN1	400	4.17	.880	.775
IVSN2	400	4.03	1.059	1.122
IVSN3	400	4.06	.948	.899
IVB1	400	3.88	1.053	1.108
IVB2	400	4.18	.923	.852
IVB3	400	4.24	.902	.814
DV1	400	3.56	1.138	1.295
DV2	400	3.64	1.076	1.158
DV3	400	3.70	1.057	1.117
Valid N (listwise)	400			

4.5 Validity and Reliability Test

In this section Cronbach’s Alpha was used to test the reliability coefficient to know does each statement positively correlated with another statement. When there was high reliability means that the statement was correlated with all the variables. This reliability contained 400 respondents that answer the questionnaire, and the result was shown at Table 4.4 the reliability test result of the study.

Table 4.4: Reliability Test Result of the Study

Variables	Cronbach’s Alpha	No. Items
Attitude → Awareness	0.828	3
Subjective Norm → Awareness	0.738	3
Perceived Behavioural Control → Awareness	0.811	3
Data Analytics Course Awareness	0.859	3

Based on Table 4.4, the result show Cronbach’s Alpha for the dependent variable and independent variable. The value of Cronbach’s Alpha for the attitude is 0.828, then the value of SN is 0.738

while the value of PBC is 0.811. The value of Cronbach’s Alpha of data analytics course awareness among bachelor students is 0.859. According to result the internal consistency of dependent variable and independent variable is good and acceptable.

4.6 Normality Test

Table 4.5 show the finding of normality test. It has 2 types of tests used, which are the Kolmogorov-Smirnova test, and the Shapiro-Wilk test was running in this normality test. Based on table 4.5 the test of normality, there are the significant of both tests between Kolmogorov-Smirnova test and the Shapiro-Wilk test. It shows, the value for the significant of all the variables are normal (0.00). This variable is normally distributed and the null hypothesis for each variable was accepted.

Table 4.5: Result of Test Normality

Variables	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Attitude	.155	400	.000	.906	400	.000
Subjective Norm (SN)	.162	400	.000	.892	400	.000
Perceived Behavioral Control (PCB)	.162	400	.000	.885	400	.000
Data Analytics Course Awareness (DACA)	.096	400	.000	.949	400	.000

a. Lilliefors Significance Correction

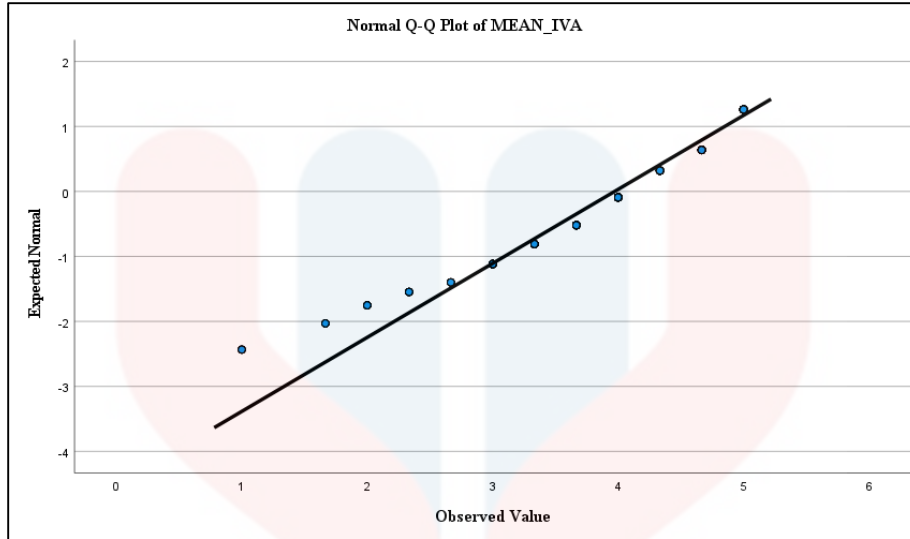


Figure 4.1: Normal Q-Q Plot of Attitude

The normal distribution of attitude in Figure 4.1 shows a slight deviation of the actual sample distribution (plot) from the theoretical normal distribution line. This indicates that the given data are normally distributed.

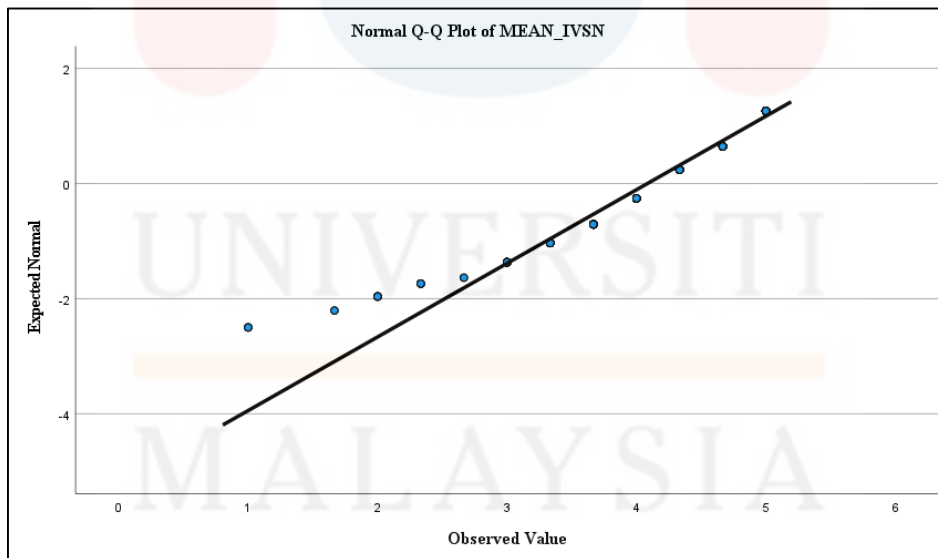


Figure 4.2: Normal Q-Q Plot of Subjective Norm

The normal distribution of SN in Figure 4.2 shows a slight deviation of the actual sample distribution (plot) from the theoretical normal distribution line. This indicates that the given data are normally distributed.

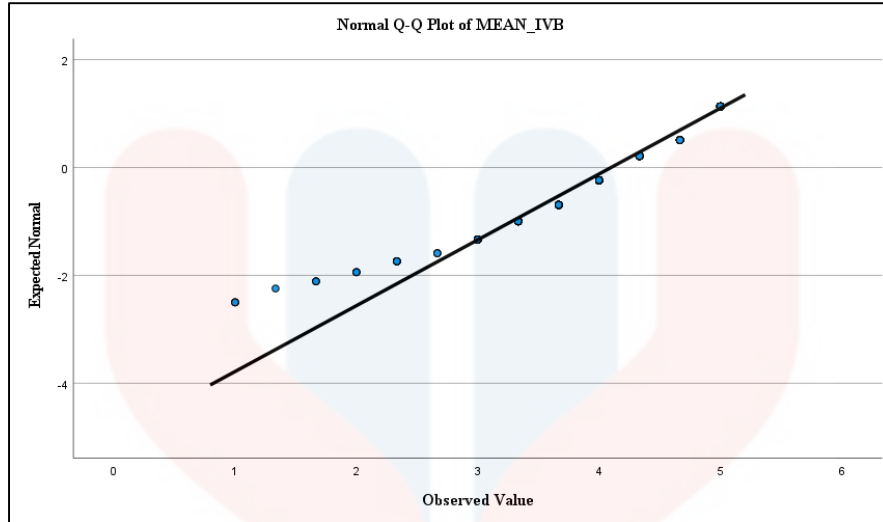


Figure 4.3: Normal Q-Q Plot of PBC

The normal distribution of perceived behavioural control in Figure 4.3 shows a slight deviation of the actual sample distribution (plot) from the theoretical normal distribution line. This indicates that the given data are normally distributed.

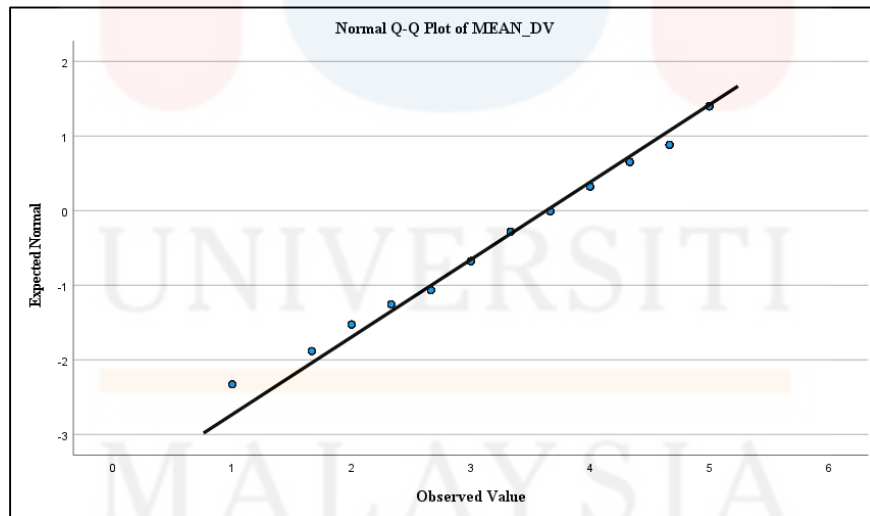


Figure 4.4: Normal Q-Q Plot of Data Analytics Course Awareness

The normal distribution of data analytics course awareness in Figure 4.4 shows a slight deviation of the actual sample distribution (plot) from the theoretical normal distribution line. This indicates that the given data are normally distributed.

4.7 Hypotheses Testing

The results of the research that has been conducted, shown that the hypothesis was positive and acceptable. Based on Table 4.6 there is a substantial and positive association between attitude, SN, PBC and data analytic course awareness. The result also shown by using the Pearson Correlation Coefficient.

Table 4.6: Hypothesis Relationship

Number of Hypothesis	Hypothesis Relationship	Result
H1: Attitude → Awareness	There is a substantial and positive association between attitude and data analytic course awareness	Acceptable
H2: SN → Awareness	There is a substantial and positive association between subjective norm and data analytic course awareness	Acceptable
H3: PCB → Awareness	There is a substantial and positive association between perceived behaviour control and data analytic course awareness	Acceptable

4.7.1 Pearson Correlation Coefficient

Pearson correlation analysis is a statistical approach that determines the strength of a linear relationship between two variables. It assesses the correlation between two variables. The Pearson correlation coefficient, also known as the Pearson product-moment correlation coefficient, indicates the strength of a linear relationship between two variables. The scale goes from -1 to +1, with -1 representing a perfect negative linear relationship, 0 indicating no linear relationship, and +1 indicating a perfect one. Table 4.7 shows the result of the correlation coefficient among independent variables and dependent variables by using Pearson's Correlation Coefficient.

Table 4.7: Result of Pearson Correlation Coefficient

		Data Analytics Course Awareness (DACA)	Attitude	Subjective Norm (SN)	Perceived Behavioural Control (PCB)
Data Analytics Course Awareness (DACA)	Pearson Correlation	1	.416**	.432**	.464**
	Sig. (2-tailed)		.000	.000	.000
	N	400	400	400	400
Attitude	Pearson Correlation	.416**	1	.578**	.686**
	Sig. (2-tailed)	.000		.000	.000
	N	400	400	400	400
Subjective Norm (SN)	Pearson Correlation	.432**	.578**	1	.677**
	Sig. (2-tailed)	.000	.000		.000
	N	400	400	400	400
Perceived Behavioral Control (PCB)	Pearson Correlation	.464**	.686**	.677**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	400	400	400	400

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4.7 points out a data analytic course awareness between each independent variable attitude, SN and PBC. The result show that all independent variables and data analytic course awareness have a positive and perfectly relevant relationship. The value between the attitude and

data analytic course awareness among bachelor students is 0.416, while the SN is 0.432, and the PBC is 0.464. Therefore, all the hypothesis is very weak according to the table of Pearson correlation coefficient values. The objective of these independent variables is to observe whether there's a significant and positive relationship between the attitude, SN, PBC and data analytics course awareness.

4.8 Summary

In this chapter, all the data analysis results are obtained by running the SPSS software. The collected data are used for descriptive analysis, reliability test and Pearson Correlation to determine the relationship between the independent variable and the dependent variable in order to identify the determination of key factors influencing data analytics course awareness among bachelor students in the ECPM. In the chapter 5, the findings of the results for the relationship between the independent variable and the dependent variable as well as the determination of key factors influencing data analytics course awareness will be further discussed and explained.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

In this chapter, the most important findings were reviewed, and the researchers also offered some conclusions to support the findings and the results to determine the key factors influencing data analytics course awareness among bachelor students on the East Coast of the Peninsular Malaysia were related to each of the independent variables. This chapter also focused on the study findings based on responses from the 400 respondents via Google Forms. It was decided whether or not each study target was met, as well as answering all of the issues raised by the research (Edelmayer, 2020). Following that, the implications of this study were examined, an explanation of the limitations of the study was provided, and some suggestions for more research were made.

5.2 Key Findings

The key findings of this study highlighted crucial insights into the factors influencing data analytics course awareness among bachelor students in the East Coast of Peninsular Malaysia (ECPM). The study included 400 respondents, with 63.5% female and 36.5% male participants. The majority of respondents were 25 years old and above. The highest number of respondents is from others programme with 31.3%. Year 4 students constituted the highest proportion, and Kelantan was the most represented location.

This study employed the Theory of Planned Behaviour (TPB) as its theoretical framework. The method used in this study was the quantitative method. A questionnaire through Google Forms was used to collect data from the respondents. The data analysis used was preliminary analysis,

descriptive statistics, normality test, frequency analysis, reliability analysis, and correlation of the coefficient. All data were evaluated using the Statistical Package for the Social Sciences (SPSS) (Williams, 2023).

The independent variables in this research were attitude, SN, and perceived behavioural control (PBC) (Sarkam et al., 2020). While the dependent variable was data analytics course awareness. In this research, results showed that there was a substantial and positive relationship between independent variables and data analytics course awareness among bachelor students in the ECPM. In the context of Cronbach's alpha, a value greater than 0.7 scores is generally considered good, excellent, and indicative of acceptable internal consistency (Frost, 2022). The reliability tests demonstrated good internal consistency for the variables, with Cronbach's alpha scores of 0.828 for attitude, 0.738 for SN, 0.811 for PBC, and 0.859 for data analytics course awareness among bachelor students in the ECPM.

5.3 Discussion

This section discussed the hypothesis result. It showed the result of Pearson Correlation Coefficient Analysis and hypothesis test result for every variable. Table 5.1 showed the result of Pearson Correlation Coefficient Analysis from SPSS. Then, Table 5.2 showed the Hypothesis Test result from SPSS. Next, Table 5.3 showed Reliability Test result from Smart PLS and table 5.4 showed Hypothesis test result from Smart PLS. Furthermore, Figure 5.1 stated the PLS-SEM algorithm result, and Figure 5.2 showed the Bootstrapping result.

5.3.1 Hypothesis 1

H1: There was a substantial and positive association between attitude and data analytic course awareness among bachelor students in the ECPM.

Based on Table 5.1, the correlation value and between attitude and data analytics course awareness are 0.416. The p-value and between attitude and data analytics course awareness are <0.000 . The result showed a positive relationship between attitude and data analytic course awareness among bachelor students in the ECPM. Based on Table 5.2, the correlation value is 0.416, which means there is a low positive correlation (Nickolas, 2023). The hypotheses can be accepted when the significant value is less than 0.05 (Mcleod, 2023). So, the results indicate the hypothesis 1 is accepted because the significant value is less than 0.05.

It was shown that the attitude factors, namely behavioral belief and evaluation, greatly influenced and impacted bachelor students on their awareness of the data analytics course. When students had positive beliefs about the usefulness of data analytics, it contributed to a positive overall attitude (Robert et al., 2016). Furthermore, how students assessed the importance and relevance of these courses played a significant role. Positive evaluations of the courses' significance led to a more positive overall attitude among students (Marcozzi, 2023). In summary, the research findings provide empirical support for the Theory of Planned Behavior (TPB), confirming that attitude, shaped by behavioral beliefs and evaluations, plays a crucial role in influencing bachelor students' awareness of data analytics courses.

5.3.2 Hypothesis 2

H2: There was a substantial and positive association between subjective norm (SN) and data analytic course awareness among bachelor students in the ECPM.

Based on Table 5.1, the correlation value and between attitude and data analytics course awareness are 0.432. The p-value and between attitude and data analytics course awareness are <0.000 . The result showed a positive relationship between SN and data analytic course awareness among bachelor students in the ECPM. Based on Table 5.2, the correlation value is 0.432, which means there is a low positive correlation (Nickolas, 2023). The hypotheses can be accepted when the significant value is less than 0.05 (Mcleod, 2023). So, the results indicate the hypothesis 2 is accepted because the significant value is less than 0.05.

It was shown that the SN factors, namely normative belief and motivation to comply, greatly influenced and impacted bachelor students on their awareness of the data analytics course. When students had positive beliefs about what others expected, it shaped their overall view of data analytics courses (Marcozzi, 2023). The motivation to align their behavior with these expectations played a key role. If students were motivated to meet these expectations, it significantly influenced how they viewed data analytics courses (Abdulrahman et al., 2023). In summary, the findings support the TPB by demonstrating that students' awareness of data analytics courses is influenced by their SN, encompassing normative beliefs and motivation to comply.

5.3.3 Hypothesis 3

H3: There was a substantial and positive association between PBC and data analytic course awareness among bachelor students in the ECPM.

Based on Table 5.1, the correlation value and between attitude and data analytics course awareness are 0.464. The p-value and between attitude and data analytics course awareness are <0.000. The result showed a positive relationship between PBC and data analytic course awareness among bachelor students in the ECPM. Based on Table 5.2, the correlation value is 0.464, which means there is a low positive correlation (Nickolas, 2023). The hypotheses can be accepted when the significant value is less than 0.05 (Mcleod, 2023). So, the results indicate that hypothesis 3 is accepted because the significant value is less than 0.05.

It was shown that the PBC factors, namely control belief and perceived power, greatly influenced and impacted bachelor students on their awareness of the data analytics course. Positive beliefs about their capabilities increased their confidence in engaging with these courses (Kirk, 2023). Additionally, the influence of external factors, such as support or obstacles, played a crucial role in shaping students' perceived control (PBC) over their involvement with data analytics courses. In summary, the findings support the TPB by demonstrating that students' awareness of data analytics courses is influenced by their PBC, encompassing control beliefs and perceived power over external factors.

Table 5.1: Pearson Correlations Coefficient Analysis from SPSS

		MEAN_ DV	MEAN _IVA	MEAN _IVSN	MEAN_ IVB
MEAN_DV	Pearson Correlation	1	.416**	.432**	.464**
	Sig. (2-tailed)		.000	.000	.000
	N	400	400	400	400
MEAN_IVA	Pearson Correlation	.416**	1	.578**	.686**
	Sig. (2-tailed)	.000		.000	.000
	N	400	400	400	400
MEAN_IVSN	Pearson Correlation	.432**	.578**	1	.677**

	Sig. (2-tailed)	.000	.000	.000	.000
	N	400	400	400	400
MEAN_IVB	Pearson Correlation	.464**	.686**	.677**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	400	400	400	400

** . Correlation is significant at the 0.01 level (2-tailed).

Notes:

1. MEAN_DV → Mean of Dependent Variable (Data Analytics Course Awareness)
2. MEAN_IVA → Mean of Independent Variable Attitude
3. MEAN_IVSN → Mean of Independent Variable Subjective Norm
4. MEAN_IVB → Mean of Independent Variable Perceived Behavioural Control

Table 5.2: Hypothesis Test Result from SPSS

Hypothesis	Correlation value	P-value	Interpretation	Status
Hypothesis 1	0.416	<0.000	Low positive correlation	Accepted
Hypothesis 2	0.432	<0.000	Low positive correlation	Accepted
Hypothesis 3	0.464	<0.000	Low positive correlation	Accepted

5.3.4 Reliability Test Result from SmartPLS

In the context of Cronbach's alpha, a value greater than 0.7 scores was generally considered good, excellent, and indicative of acceptable internal consistency (Frost, 2022). Table 5.3 showed the Reliability Test result from Smart PLS. The highest Cronbach's Alpha was data analytics course awareness, which scored 0.860, and the second-highest was 0.831, the Cronbach's Alpha of the attitude variable. The lowest Cronbach's alpha score was the SN variable, which scored 0.742. The PBC variable scored 0.818. So, attitude, PBC, and data analytics course awareness variables in this study were considered good in internal consistency. The SN variable was considered acceptable in internal consistency.

Table 5.3: Reliability Test Result from SmartPLS

Variables	Cronbach's Alpha	No. Items	Internal Consistency
Attitude → Awareness	0.831	3	Good
Subjective Norm → Awareness	0.742	3	Acceptable
Perceived Behavioural Control → Awareness	0.818	3	Good
Data Analytics Course Awareness	0.860	3	Good

5.3.5 Hypothesis Test Result from SmartPLS

Based on Table 5.4, the path coefficient value and the relationship between attitude and data analytics course awareness were 0.143. The significance value and the relationship between attitude and data analytics course awareness were 0.065. The hypotheses could be supported when the significance value was less than 0.05 (Mcleod, 2023). So, the results indicated that the hypothesis between attitude and data analytics course awareness was unsupported because the significance value was more than 0.05. The first reason why the hypothesis between attitude and data analytics course awareness was unsupported is that respondents' attitudes may have varied widely, and some may not have been aware or concerned about data analytics courses. Next, the second reason is sample characteristics. The composition of the sample, including demographics and academic backgrounds, might have contributed to diverse attitudes, impacting the overall significance.

Then, the path coefficient value and the relationship between SN and data analytics course awareness were 0.224. The significance value and the relationship between SN and data analytics course awareness were 0.001. So, the results indicated that the hypothesis between SN and data analytics course awareness was supported because the significance value was less than 0.05.

Next, the path coefficient value and the relationship between PBC and data analytics course awareness were 0.291. The significance value and the relationship between PBC and data analytics course awareness were 0.000. So, the results indicated that the hypothesis between PBC and data analytics course awareness was supported because the significance value was less than 0.05.

Table 5.4: Hypothesis Test Result from SmartPLS

Hypothesis	Variables	Path Coefficient, β	Significant value, p	Remarks
H1	Attitude \rightarrow Awareness	0.143	0.065	Unsupported
H2	Subjective Norm \rightarrow Awareness	0.224	0.001	Supported
H3	Perceived Behavioural Control \rightarrow Awareness	0.291	0.000	Supported

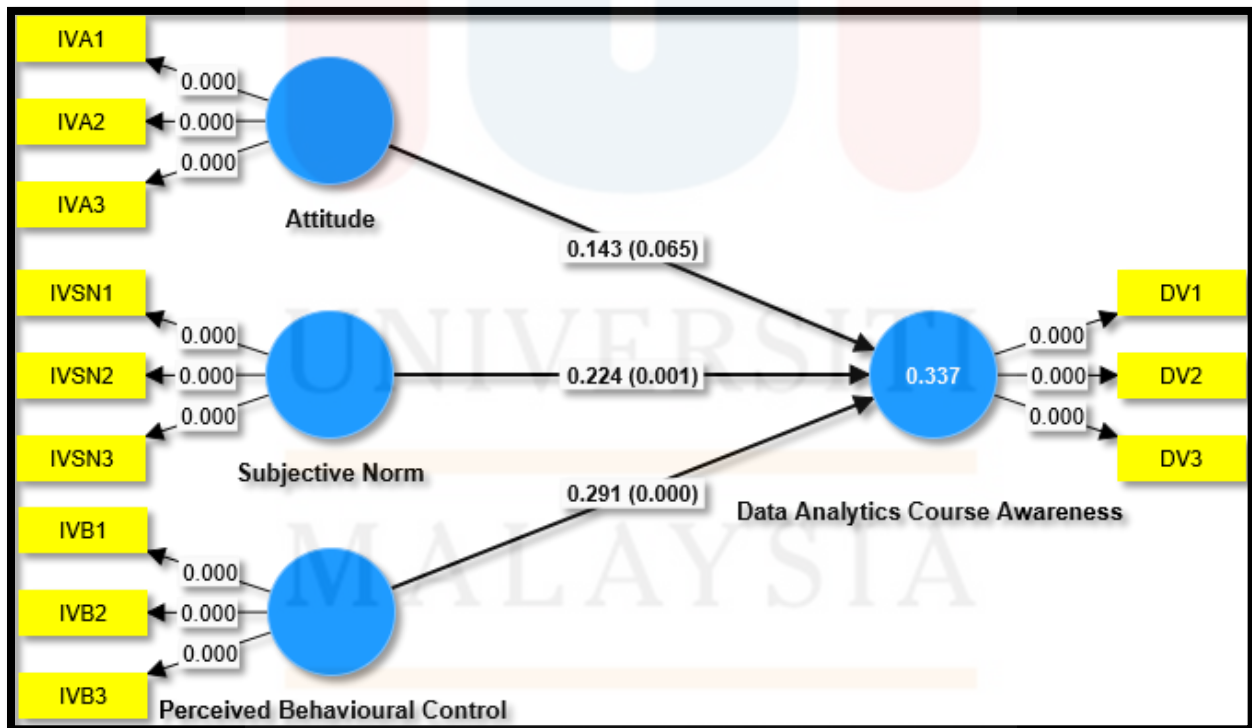


Figure 5.1: PLS-SEM Algorithm Result

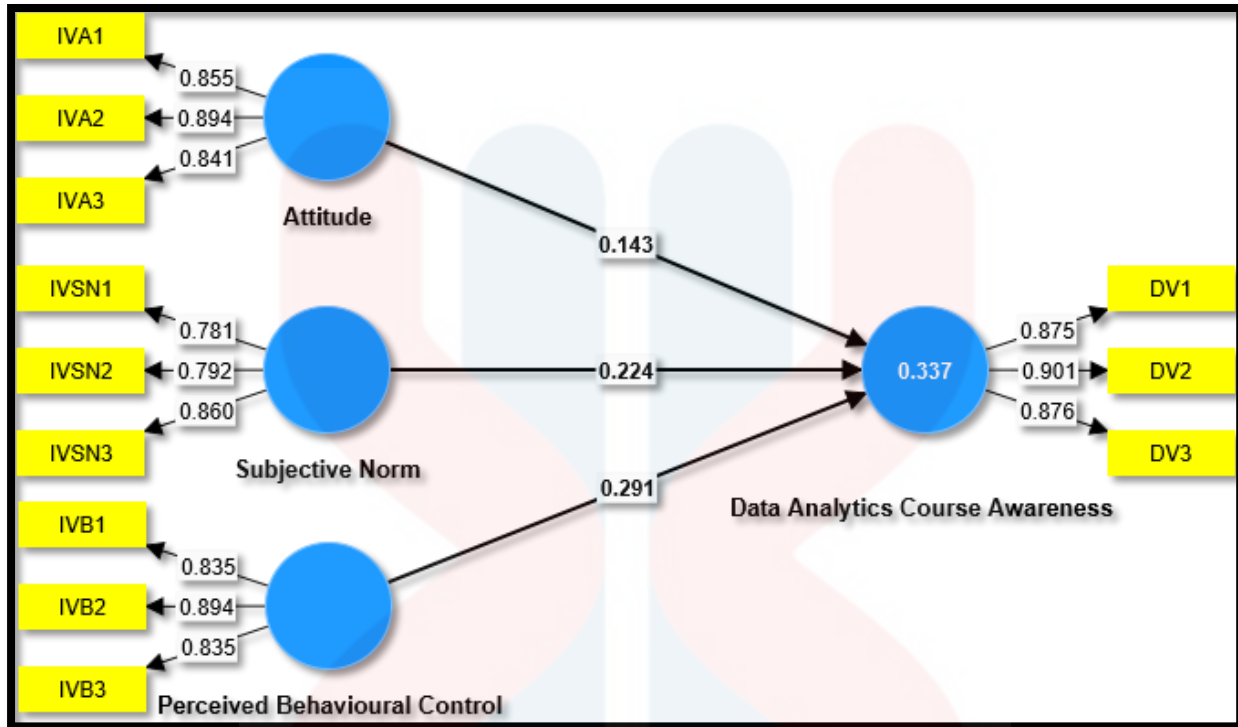


Figure 5.2: Bootstrapping Result

5.4 Implications of the Study

The findings of this research hold substantial implications for various stakeholders, including academic institutions, policymakers and students in the East Coast of the Peninsular Malaysia. The significant positive relationships identified between attitude, SN, PBC, and data analytics course awareness among bachelor students underscore the need for targeted interventions in higher education.

- For Academic Institutions

Educational institutions should consider integrating practical applications of data analytics across various disciplines, emphasizing its relevance to academic coursework and research projects. The study suggests that fostering positive attitudes towards acquiring skills in data

analytics, promoting SN through peer influence, and enhancing PBC can contribute to increased awareness among students.

- For Policymakers

Policymakers in the education sector can utilize these findings to formulate initiatives that bridge the gap between theoretical knowledge and real-world applications. Policies focusing on curriculum development, faculty training, and industry collaboration could enhance students' understanding of the benefits of data analytics courses for academic and career development.

- For Students

Students, particularly those pursuing bachelor's degrees, can benefit from targeted awareness programs. Understanding the influence of attitudes, SN, and PBC on their awareness can empower students to make informed decisions about engaging with data analytics courses.

In conclusion, addressing the implications outlined in this study can contribute to a more informed and skilled workforce, aligning higher education with the demands of the Fourth Industrial Revolution and fostering a culture of data-driven decision-making. Future research and educational initiatives should build upon these implications to further enhance data analytics awareness and its integration into academic and professional settings.

5.5 Limitations of the Study

While this study provides valuable insights into the factors influencing data analytics course awareness among bachelor students in the ECPM, it is essential to acknowledge several limitations that may impact the generalizability and interpretation of the findings.

- **Sample Characteristics**

The study focused exclusively on bachelor students in the East Coast, potentially limiting the generalizability of the findings to other regions or academic levels. The demographics of the sample, including gender distribution and program types, may also influence the transferability of results to broader student populations.

- **Research Design**

The study utilized a quantitative research design, relying on self-reported data obtained through a questionnaire. This approach may be subject to response bias and may not capture the nuances of individual experiences or perceptions. Future research employing mixed-methods approaches could provide a more comprehensive understanding of the factors influencing data analytics course awareness.

- **Cross-Sectional Nature**

The research design adopted a cross-sectional approach, capturing data at a specific point in time. This limitation hinders the establishment of causality between variables. Longitudinal studies could offer a more dynamic view of how attitudes, SN, and PBC evolve over time and their impact on awareness.

- **Self-Reported Data**

The reliance on self-reported data introduces the potential for social desirability bias, where participants may respond in a manner they perceive as socially acceptable. This bias may

affect the accuracy of responses related to attitudes, subjective norm and perceived behavioural control.

- External Factors

The study did not explore external factors that may influence data analytics course awareness, such as economic conditions, regional employment opportunities or the influence of media. Understanding these external factors could provide a more holistic perspective on the dynamics shaping awareness.

Acknowledging these limitations is crucial for interpreting the study's findings appropriately and guiding future research endeavors to address these constraints for a more comprehensive understanding of data analytics course awareness among bachelor students.

5.6 Recommendations and Suggestion for Future Research

This study has provided valuable insights into the factors influencing data analytics course awareness among bachelor students in the East Coast of the Peninsular Malaysia. To build on these findings and contribute to the broader field, several recommendations for future research are suggested.

- Exploring Regional Variances

Future research could delve into regional differences in data analytics course awareness. Comparing awareness levels and influencing factors across various regions in Malaysia would provide a nuanced understanding of the dynamics at play. Examining regional variations may uncover unique challenges and opportunities for targeted interventions.

- Longitudinal Studies

To better grasp the temporal evolution of attitudes, subjective norm and perceived behavioural control, researchers are encouraged to conduct longitudinal studies. Tracking students' perceptions over an extended period would enable the identification of trends and fluctuations, enhancing the comprehension of the long-term impact of these factors on data analytics course awareness.

- **Qualitative Inquiry**

Supplementing quantitative approaches with qualitative methods could offer a richer understanding of students' experiences. In-depth interviews or focus group discussions may unveil nuanced perspectives, capturing the qualitative aspects of attitudes, subjective norm and perceived behavioural control that quantitative measures may not fully capture.

- **Comparative Analysis**

Conducting a comparative analysis between bachelor and diploma-level students would broaden the scope of investigation. Understanding how awareness and influencing factors differ between these academic levels could inform targeted strategies for both bachelor and diploma programs.

- **External Influences**

Future research should consider exploring external factors that may impact data analytics course awareness. Economic trends, job market demands, and the role of media in shaping perceptions could provide a comprehensive view of the external forces influencing students' awareness and decision-making.

- **Intervention Studies**

Implementing and evaluating targeted interventions to enhance data analytics course awareness would contribute practical insights. Researchers could design and assess the

effectiveness of awareness campaigns or educational programs aimed at increasing students' understanding and interest in data analytics courses.

By addressing these recommendations, future research endeavors can contribute to a more nuanced and comprehensive understanding of the factors shaping data analytics course awareness among students, ultimately informing educational policies and practices to align with the evolving needs of the industry.

5.7 Overall Conclusion of the Study

In conclusion, this study aimed to determine the key factors influencing data analytics course awareness among bachelor students in the ECPM. The research employed a quantitative method and utilized the TPB as its theoretical framework. Key factors examined included attitude, SN, and PBC, with data analytics course awareness as the dependent variable. Questionnaire through Google Form was used to collect data from the respondents. The study involved 400 respondents from states such as Kelantan, Terengganu and Pahang.

The findings revealed significant positive relationships between attitude, SN, PBC, and data analytics course awareness among bachelor students in the ECPM. The results of the reliability tests, measured through Cronbach's alpha, indicated good internal consistency for all the variables, reinforcing the reliability of the study.

The discussion highlighted the importance of attitude, SN, and PBC in influencing data analytics course awareness. Academic institutions, policymakers, and students in the ECPM can benefit from the implications of this study. Recommendations for future research include exploring

regional variances, conducting longitudinal studies, employing qualitative inquiry, performing comparative analyses, considering external influences, and conducting intervention studies.

Despite the valuable insights provided by this study, it is essential to acknowledge certain limitations, such as sample characteristics, research design, cross-sectional nature, self-reported data, and external factors. Future research endeavors can address these limitations and contribute to a more nuanced understanding of the factors influencing data analytics course awareness among students.

In summary, this study contributes to the academic discourse on data analytics course awareness and provides actionable insights for educational institutions and policymakers to enhance students' awareness and preparation for the demands of the Fourth Industrial Revolution.

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APPENDIX A - DRAFT OF QUESTIONNAIRE

DETERMINATION OF KEY FACTORS INFLUENCING DATA ANALYTICS COURSE AWARENESS AMONG BACHELOR STUDENTS IN THE EAST COAST OF THE PENINSULAR MALAYSIA

Dear Respondent,

We are a group of SAK 11 and also Year 4 students from the Faculty of Entrepreneurship and Business (FKP) at the Universiti Malaysia Kelantan (UMK), pursuing a Bachelor of Entrepreneurship (Commerce) with Honors. Our group includes four members namely Mohammad Azrul Bin Kamarulzaman, Nor Shafiqah Suhana Binti Shaharom, Nurul Izzati Farhana Binti Mohd Kamal and Ong Joo Hoon

We're conducting a survey to explore the factors influencing awareness of data analytics course among bachelor students in the East Coast of the Peninsular Malaysia. Your input is vital to our research and all your responses are completely confidential and used solely for research purposes.

Your participation in this survey is voluntary and you can withdraw at any time without any consequences. We do not require your name or sensitive information, ensuring your anonymity and confidentiality. Rest assured, there are no personal meetings and we won't collect your name, contact information or IP address.

Thank you for your time and valuable input.

Responden yang dihormati,

Kami merupakan kumpulan SAK 11 dan juga pelajar Tahun 4 Fakulti Keusahawanan dan Perniagaan (FKP) Universiti Malaysia Kelantan (UMK), mengikuti pengajian Ijazah Sarjana Muda Keusahawanan (Perdagangan) dengan Kepujian. Kumpulan kami merangkumi empat orang ahli iaitu Mohammad Azrul Bin Kamarulzaman, Nor Shafiqah Suhana Binti Shaharom, Nurul Izzati Farhana Binti Mohd Kamal dan Ong Joo Hoon.

Kami sedang menjalankan tinjauan untuk meneroka Penentuan Faktor Utama Mempengaruhi Kesedaran Kursus Analisis Data Dalam Kalangan Pelajar Sarjana Muda di Pantai Timur Semenanjung Malaysia. Input anda adalah penting untuk penyelidikan kami dan semua respons anda adalah sulit sepenuhnya dan digunakan semata-mata untuk tujuan penyelidikan.

Penyertaan anda dalam tinjauan ini adalah secara sukarela dan anda boleh menarik diri pada bila-bila masa tanpa sebarang akibat. Kami tidak memerlukan nama atau maklumat sensitif anda, memastikan kerahsiaan dan kerahsiaan anda. Yakinlah, tiada mesyuarat peribadi dan kami tidak akan mengumpul nama, maklumat hubungan atau alamat IP anda.

Terima kasih atas masa dan input berharga anda.

UNIVERSITI
MALAYSIA
KELANTAN

SECTION A: DEMOGRAPHIC INFO**BAHAGIAN A: MAKLUMAT DEMOGRAFI**

You are required to place a tick (/) at the appropriate answer.

Anda dikehendaki meletakkan tanda (/) pada jawapan yang sesuai.

A1. Gender / Jantina:

What is your gender?

Apakah jantina anda?

Male / <i>Lelaki</i>	<input type="checkbox"/>
Female / <i>Perempuan</i>	<input type="checkbox"/>

A2. Age / Umur:

What is your age?

Berapakah umur anda?

21 Years Old / <i>21 Tahun</i>	<input type="checkbox"/>
22 Years Old / <i>22 Tahun</i>	<input type="checkbox"/>
23 Years Old / <i>23 Tahun</i>	<input type="checkbox"/>
24 Years Old / <i>24 Tahun</i>	<input type="checkbox"/>
25 Years Old and Above / <i>25 Tahun dan Keatas</i>	<input type="checkbox"/>

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KELANTAN

A3. Programme / Program:

What is your study programme?

Apakah program pengajian anda?

Science, Technology, Engineering and Mathematics (STEM) / <i>Sains, Teknologi, Kejuruteraan dan Matematik (STEM)</i>	
Business and Management / <i>Perniagaan dan Pengurusan</i>	
Humanities and Social Sciences / <i>Kemanusiaan dan Sains Sosial</i>	
Arts and Design / <i>Seni dan Reka Bentuk</i>	
Other / <i>Lain- Lain</i>	

A4. Year of Study / Tahun Pengajian:

What is your year of study?

Apakah tahun pengajian anda?

Year 1 / <i>Tahun 1</i>	
Year 2 / <i>Tahun 2</i>	
Year 3 / <i>Tahun 3</i>	
Year 4 / <i>Tahun 4</i>	

A5. Location / Lokasi:

Which East Coast region of the Peninsular Malaysia do you live in?

Di wilayah Pantai Timur Semenanjung Malaysia manakah anda tinggal?

Kelantan	
Terengganu	
Pahang	

SECTION B: GENERAL QUESTION

BAHAGIAN B: SOALAN AM

This section will ask you about general questions. You are required to place a tick (/) based on the column YES OR NO.

Bahagian ini akan bertanyakan kepada anda tentang soalan umum. Anda dikehendaki meletakkan tanda (/) pada jawapan yang sesuai berdasarkan kolum BETUL atau TIDAK.

Data Analytic Course Awareness		<u>YES</u>	<u>NO</u>
B1.	<p>Have you ever taken a data analytic course Microsoft Excel Application that related to course as part of your studies?</p> <p><i>Pernahkah anda mengambil kursus Analitik Data seperti Aplikasi Microsoft Excel sebagai sebahagian daripada pengajian anda?</i></p>		
B2.	<p>Have you received any information or guidance regarding data analytic courses such as Microsoft Excel application and Google Analytic from your academic advisors or faculty members?</p> <p><i>Adakah anda telah menerima maklumat atau bimbingan daripada kursus analisis data seperti aplikasi Microsoft Excel dan Google Analytic daripada penasihat akademik atau rakan fakulti?</i></p>		
B3.	<p>Are you aware of any career opportunities or job prospects related to data analytic in your region?</p>		

	<p><i>Adakah anda mengetahui sebarang peluang kerjaya yang berkaitan dengan analisis data di rantau anda?</i></p>		
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SECTION C: INDEPENDENT VARIABLE (IV)

BAHAGIAN C: PEMBOLEHUBAH BEBAS

This section will measure your Attitude, Subjective Norm and Perceived Behavioural Control .please mark your answer based on the scale from 1 to 5.

Bahagian ini akan mengukur Pengetahuan, Sikap dan Tingkah Laku anda. sila tandakan jawapan anda berdasarkan skala dari 1 hingga 5.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

ATTITUDE		<u>SD</u>	<u>D</u>	<u>N</u>	<u>A</u>	<u>SA</u>
C1.	<p>I believe acquiring skills in Microsoft Excel application would positively impact my academic coursework and research projects.</p> <p><i>Saya percaya memperoleh kemahiran dalam aplikasi Microsoft Excel akan memberi kesan positif kepada kerja kursus akademik dan projek penyelidikan saya.</i></p>	1	2	3	4	5
C2.	<p>I evaluate the importance of Microsoft Excel application skills in enhancing academic coursework and research projects.</p> <p><i>Saya menilai kepentingan kemahiran aplikasi Microsoft Excel dalam meningkatkan kerja kursus akademik dan projek penyelidikan.</i></p>	1	2	3	4	5

C3.	I positively evaluate the necessity of managing Microsoft Excel application among bachelor students. <i>Saya menilai secara positif keperluan mengurus aplikasi Microsoft Excel dalam kalangan pelajar sarjana muda.</i>	1	2	3	4	5
SUBJECTIVE NORM		<u>SD</u>	<u>D</u>	<u>N</u>	<u>A</u>	<u>SA</u>
C4.	I believe the influence of peers is important in shaping awareness of data analytics courses. <i>Saya percaya pengaruh rakan sebaya adalah penting dalam membentuk kesedaran tentang kursus analitik data.</i>	1	2	3	4	5
C5.	I find strong motivation to consider family and friends' expectations when deciding on data analytics courses. <i>Saya mendapat motivasi yang kuat untuk mempertimbangkan jangkaan keluarga dan rakan apabila memutuskan kursus analitik data.</i>	1	2	3	4	5
C6.	I found that my family's expectations were a key factor in shaping my perspective on data analytics courses. <i>Saya mendapati bahawa jangkaan keluarga saya merupakan faktor utama dalam membentuk perspektif saya tentang kursus analitik data.</i>	1	2	3	4	5
PERCEIVED BEHAVIOURAL CONTROL		<u>SD</u>	<u>D</u>	<u>N</u>	<u>A</u>	<u>SA</u>
C7.	I believe that integrating Microsoft Excel application in academic activities is within my control. <i>Saya percaya bahawa penyepaduan aplikasi Microsoft Excel dalam aktiviti akademik adalah dalam kawalan saya.</i>	1	2	3	4	5
C8.	I perceive myself as powerful in organizing and comprehending data using Microsoft Excel application in academic tasks.	1	2	3	4	5

	<i>Saya merasakan diri saya berkuasa dalam menyusun dan memahami data menggunakan aplikasi Microsoft Excel dalam tugas akademik.</i>					
C9.	I believe that possessing Microsoft Excel application skills empowers me for future career opportunities. <i>Saya percaya bahawa memiliki kemahiran aplikasi Microsoft Excel memperkasakan saya untuk peluang kerjaya masa hadapan.</i>	1	2	3	4	5

SECTION D: DEPENDENT VARIABLES (DV)

BAHAGIAN D: PEMBOLEH UBAH BERGANTUNG

This section will measure your data analytic course awareness. Please mark your answer based on the scale from 1 to 5.

Bahagian ini akan mengukur kesedaran kursus analisis data. Sila tandakan jawapan anda berdasarkan skala dari 1 hingga 5.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Data Analytic Course Awareness		<u>SD</u>	<u>D</u>	<u>N</u>	<u>A</u>	<u>SA</u>
D1.	I am highly aware of Data Analytic courses offered at my university. <i>Saya sangat mengetahui kursus Analisis Data yang ditawarkan di universiti saya.</i>	1	2	3	4	5
D2.	I have a strong understanding of the benefits of taking Data Analytic courses for my academic and career development.	1	2	3	4	5

	<i>Saya mempunyai pemahaman yang kukuh tentang faedah mengambil kursus Analisis Data untuk pembangunan akademik dan kerjaya saya.</i>					
D3.	<p>I'm aware of the content and potential career opportunities associated with the Data Analytics course at my university.</p> <p><i>Saya sedia maklum berkenaan kandungan dan peluang kerjaya yang berpotensi yang dikaitkan dengan kursus Analitik Data di universiti saya.</i></p>	1	2	3	4	5

APPENDIX B – GANTT CHART

GANTT CHART OF RESEARCH PROJECT (SAK 11)																		
DATE	ACTIVITY	WEEK	PPTA 1					m	PPTA 2									
			1	2	3	4	5		6	7	8	9	10	11	12	13	14	15
8/10	Briefing on PPTA 1 & PPTA 2 by the coordinator (Madam A'mirah Binti Mohd Yaziz).																	
	Identify group members and create a WhatsApp group with Dr. Fatihah Binti Mohd, the supervisor.																	
12/10	First meeting and discussion about the title of the research project suggested by Dr. Fatihah.																	
15/10	All group members searching for base articles for research projects.																	
	Division of tasks between group members from Chapter 1 until the questionnaire.																	
22/10	Attended a basic report writing workshop for the SAK program through the Zoom platform.																	
24/10	Correcting the title of the research project and re-researching the correct base article.																	
26/10	Scheduling a follow-up meeting with the supervisor for next week.																	

27/10	Make corrections in the writing of the research project from Chapter 1 to the questionnaire.																		
28/10	Collected as many as 20 supporting articles for the writing of the research project.																		
1/11	Second meeting and discussion with the supervisor in class B104D.																		
	The supervisor reviews and criticizes the research project's writing. Make corrections.																		
2/11	RMIC Coffee Talk: UMK Policy Against Plagiarism via Zoom																		
8/11	Third meeting and discussion with the supervisor in class B104D.																		
	The supervisor reviews and criticizes the research project's writing. Make corrections.																		
10/11	Submit the research project report (PPTA 1) for final review by the supervisor.																		
14/11	Submit a full report of the research project (PPTA 1) to the supervisor.																		
15/11	Submit slides and presentation video to the supervisor and examiner.																		
22/11	PPTA 1 discussion online via Google Meet with the supervisor and make a colloquium draft.																		

29/11	Submit the colloquium draft for review by the supervisor and make corrections.																		
6/12	Completing the colloquium assignment (No face-to-face meeting).																		
13/12	Collect and obtain data from respondents for research purposes.																		
20/12	Submit the colloquium assignment to be reviewed by the supervisor.																		
27/12	Submit assignments and colloquium posters to be reviewed by the supervisor.																		
3/1	Submit chapter 4 and 5 assignments to be reviewed by the supervisor.																		
4/1	Submit chapter 4 and 5 assignments to be checked a second time by the supervisor.																		
6/1	Submit article paper and poster assignments in google drive for review and scoring.																		
10/1	Send the final report which is PPTA 2 to be reviewed by the supervisor and also make corrections.																		
15/1	Colloquium poster presentation at UMK City Campus Entrepreneurship Hall.																		
	Send the final report (PPTA 2) to be reviewed a second time by the supervisor.																		

