THE EMPLOYABILITY MODEL FOR THE MULTIPLE INTELLIGENCE OF PEOPLE WITH EPILEPSY

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Special dedicated to *Mak dan Baba*

I Love You

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ABSTRACT

The objectives of this study are to identify the intelligence profiles of People with Epilepsy (PWE) based on Ability Test in Epilepsy, ATIE© (2008), the PWE's type of intelligence and their employment status, to develop an Employability Model which involves significant factors that lead to high employability and to determine the significant factors for PWE high employability. The data used in this study are the integration with the data from the previous study by Awang in 2012 on the multiple intelligence of PWE in Malaysia. Awang (2012) used 166 data from Neurology Department, Kuala Lumpur General Hospital (HKL). However, the sample in this study consists of outpatients at the Neurology Department HKL and Hospital Sultanah Aminah (HSA), Johor Bahru. The sample size from HKL are 148 patients and from HSA are 67 patients that made up a total sample of 215 patients. Two main methods used in this study are descriptive statistics and logistic regression analysis. The descriptive statistics shows that the intelligence profiles that are mostly possessed by PWE are mediocre level of musical intelligence (40.5%), high level of kinesthetic intelligence (40.5%), high level of math/logic intelligence (38.6%), high level of spatial intelligence (41.4%), mediocre level of linguistic intelligence (38.1%), high interpersonal intelligence (57.2%), high level of intrapersonal intelligence (58.6%) and mediocre level of naturalistic intelligence (41.4%). From the logistic regression method, two models were developed which are the full model and the Employability Model. As a conclusion, the Employability Model build shows eleven significant factors that increase the chances for the PWE to be employed namely gender, marital status, education background, age of the respondents, onset age, musical intelligence, kinesthetic intelligence, logic/math intelligence, spatial intelligence, intrapersonal intelligence and naturalistic intelligence.

ABSTRAK

Objektif-objektif kajian ini adalah untuk mengenal pasti profil kecerdasan Pesakit Epilepsi (PWE) berdasarkan Keupayaan Ujian dalam Epilepsi, ATIE$^{©}$(2008), jenis kecerdasan PWE dan status pekerjaan mereka, untuk membina Model Pekerjaan yang melibatkan faktor-faktor penting yang membawa kepada peluang pekerjaan yang tinggi dan untuk menentukan faktor-faktor yang penting bagi peluang pekerjaan yang tinggi untuk PWE. Data yang digunakan dalam kajian ini adalah merupakan integrasi dengan data daripada kajian sebelum ini oleh Awang pada tahun 2012 pada kepelbagaian kecerdasan PWE di Malaysia. Awang (2012) menggunakan 166 data dari Jabatan Neurologi, Hospital Besar Kuala Lumpur (HKL). Walau bagaimanapun, sampel dalam kajian ini terdiri daripada pesakit luar di Neurologi Jabatan, HKL dan Hospital Sultanah Aminah (HSA), Johor Bahru. Saiz sampel dari HKL adalah 148 pesakit dan dari HSA adalah 67 pesakit yang membentuk sejumlah sampel yang terdiri daripada 215 pesakit. Dua kaedah utama yang digunakan dalam kajian ini ialah statistik deskriptif dan analisis regresi logistik. Statistik deskriptif menunjukkan bahawa profil kecerdasan yang PWE yang paling dimiliki adalah kecerdasan muzik tahap sederhana (40.5%), kecerdasan kinestetik tahap tinggi (40.5 %), kecerdasan matematik/logik tahap tinggi (38.6%), kecerdasan ruang tahap tinggi (41.4%), kecerdasan linguistik tahap sederhana (38.1%), kecerdasan interpersonal tahap tinggi (57.2%), kecerdasan intrapersonal tahap tinggi (58.6%) dan kecerdasan naturalistic tahap sederhana (41.4%). Dari kaedah regresi logistic dua model telah dibina iaitu model penuh dan Model Pekerjaan. Kesimpulannya, Model Pekerjaan yang dibina menunjukkan sebelas faktor penting yang dapat meningkatkan peluang untuk PWE diambil kerja iaitu jantina, status perkahwinan , kategori pendidikan, umur responden, umur permulaan mengidap epilepsi, kecerdasan muzik, kecerdasan kinestetik, kecerdasan logik/matematik, kecerdasan ruang, kecerdasan intrapersonal dan kecerdasan naturalistik.

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LIST OF ACRONYMS

PWE	People with Epilepsy
ILAE	International League Against Epilepsy
MI	Multiple Intelligence
ATIE$^©$	Ability Test in Epilepsy
HKL	Hospital Kuala Lumpur
HSA	Hospital Sultanah Aminah
HRP	Human Resource Personnel
HR	Human Resource
WHO	World Health Organization
KCMC	Kilimanjaro Christian Medical Centre
FIA	Fuzzy Inverse ATIE
AKA	Awareness, Knowledge and Attitudes
IQ	Intelligence Quotient
AHP-DEA	Analytic Hierarchy Process and Data Envelopment Analysis
SPSS	Statistical Package for the Social Sciences
AED	Antiepileptic Drugs
VIF	Variance Inflation Factor
df	Degree of Freedom
LL	Likelihood
Z_f	Full Model
Z_e	Employability Model

CHAPTER 1

INTRODUCTION

This chapter is divided into several sections which consist of the background of study, statement of problem, research questions and objectives, scope of the study, significance of the study, research limitations, research approach, conceptual and operational definitions, research framework and finally the summarization of this chapter. The background of the study focuses on brief explanation of the main components of this study which are the Epilepsy and Multiple Intelligence. The problem statement discusses the main issue in this study which is related to employment among People with Epilepsy (PWE).

1.1 Background of Study

Epilepsy is a term given for syndromes of epileptic seizures. An epileptic seizure is a disorder of the nervous system in which abnormal electrical activity in the brain causes a seizure. A seizure means sudden uncontrolled waves of electrical activity in the brain that cause involuntary movement or loss of consciousness (Schmidtand and Willis, 2007).

Epilepsy is a common, chronic and serious neurological disease that affects approximately 50 million individuals (Lim *et.al*, *2013*). People with epilepsy (PWE) are burdened by a multitude of social, psychological, and economic consequences of this disease and also suffer from stigmatization that leads to a poor quality of life.

Understanding the socioeconomic and physiological impacts of epilepsy is important to control the seizures (Lim *et al*., 2013).

Epilepsy can also be defined as impairment in behavior or motor function caused by an electrical discharge from the brain. Most of the time seizures do not recur or require treatment. Infection, head injury, chemical imbalance, stroke or brain tumor may provoke seizures. About 2% of the general population is found to have epilepsy and it occurs more often in 25-35% of people with neurological based disabilities. It also occurs frequently in people that have a manifestation of brain injury or differences in brain development Centre for Developmental Disability Health Victoria (2005).

According to Fisher *et.al* (2005), different types of the seizure can be classified into generalized or localized/partial seizures. Generalized seizures are divided according to the effect on the body but they all involve loss of consciousness while partial seizures are further divided on the extent to which consciousness is affected and the localization of the seizure. If the level of consciousness is not affected during the seizure, it can be considered as a simple partial seizure but if the consciousness is affected, it is called a complex partial seizure. Secondary generalization can also occur if the partial seizure spreads within the brain (Preedy and Watson, 2010). Although epilepsy can be related to the brain, it has no correlation with individual intelligence (Awang, Aripin, Rafia and Ahmad, 2011).

Our current understanding of intelligence and its recent development have been briefly overviewed by numerous intelligence theorists and researchers. Binet, an early intelligence researcher believed that intelligence was comprised of comprehension, inventiveness, direction and criticism. Nevertheless, various definitions and theories of intelligence have been suggested by scholars (Visser, Ashton and Vernon, 2006; Awang, 2008; Vasile and Gabriel, 2011). Therefore, to achieve the objectives of this study, Howard Gardner's Multiple Intelligence (MI) Theory is being used (Gardner, 1983). Eventually, a model will be developed based on this theory.

1.2   Statement of Problem

Seeking employment is one of the main problems faced by people who are living with epilepsy. In previous studies, epilepsy is associated with high expected rates of unemployment and underemployment. For example, a survey conducted in 1995 in the United States revealed that 25% of PWE were unemployed as compared with 5% of the overall population. Similarly, in the United Kingdom, the unemployment rate was 46% among PWE in contrast to 19% of the general population. In Netherlands, it was found that 48% of PWE were unemployed compared to 20% of the general population (Varma, *et.al*, 2007).

It is important for a person to have a job. When someone does have a job, the person is able to meet all the requirements that are needed in their daily routine. It can be seen when a previous study by Majkowska-Zwolińka *et.al* (2012) stated that professional work contributes an important element of social functioning and individual goal realization for an individual. It also shows employment is not just a source of income, but also helps construct a sense of belonging to a group and to maintain self-esteem. This also is supported in the article written by Papadopoulou (2010) about the importance of getting engaged with a job. By having a job, it makes an individual feel useful because their efforts have a positive impact on others, it gives life a meaningful purpose. Therefore, feeling useful also gives a person a great boost of self-esteem and confidence which encourage them to give their best in their work.

Besides, a job can help an individual make ends meet. That means it helps them in being able to pay for the bills, make purchases which makes life easier as well as enjoy services that makes them happy. Nevertheless, without a job, they would not be able to support themselves and provide needs for the family. Lastly, having a job also helps a person learn on how to interact well with others. This is because, while working, they have to spend several hours with other people. This also gives people a great opportunity to learn on individual management in a professional manner.

In regards to the matter above, the problems that will be discussed in this study focus on the employability problems faced by PWE especially to secure and maintain their job. For example, the previous research by Lim et al., (2013), the unemployment rate for PWE in Neurology Clinic and Ward at the University of Malaya Medical Centre, Malaysia was about 27% from 250 PWE which is considered quite a high number. From this, we can see that there is a serious problem faced by the PWE in attaining employment.

Other previous studies also reveal that people with epilepsy experience difficulties in finding and maintaining regular employment (Smeets *et.al*, 2007). Several studies also confirmed the claim that unemployment and underemployment rates are generally higher for PWE as compared to the general population. PWE also has been known to have significant problems related to their employment for more than three decades. For example, PWE experience objective limitations such as those related to driving or working in situations in which they may be open to injury (Smeets *et.al*, 2007).

Therefore, this issue of employability is to be discussed from two different perspectives, the PWE themselves and the employers. From the PWE point of view, finding employment and staying employed are major concerns that affect their lifestyle and quality of life. Since even when employed, PWE may fall victim to misconceptions about epilepsy, co-worker's unawareness, prejudice, uncertainties of seizures and inability of other people to help during an attack (Majkowska-Zwolińska *et al*., 2012). Apart from that, those who have been employed believe that if their condition becomes known to their employers, they will be fired. This situation often makes PWE feel less motivated to look for and retain a job.

As for the employer, they are not necessarily conscious or aware of their responsibility to help and give support to their employees who suffer from epilepsy. Based on the Persons with Disabilities Act of Malaysia (2008) people with disabilities shall have the right for the same equal access to employment possessed by people without disabilities. It is seriously considered a wrong act if employers

treat a PWE differently from others. With that, it can also help PWE to improve their confidence to search for and obtain a job.

So, what is the best solution to help PWE in finding jobs in a competitive and challenging job market? One way is to use scientific method to help them in revealing the potential ability and natural talent that they have so they can be successful in finding a job and in making employers realize their ability and talent and consequently employers will stop abandoning them in the job market.

Another way to help PWE identify their capabilities for finding a job is by use of measuring instruments or tools known as psychometric tests. Psychometric tests have been used for many years to measure intelligence. This test refers to the testing done to individuals in order to measure their competency in a specific area of functioning. The test is also used to measure sensitivity, memory, intelligence, attitude and personality. It is commonly used by employers to choose the right person for a certain entry job. Thus, in this study, this test helps the PWE to identify the level of intelligence that they possess which is significant for them in getting a job.

Lastly, a method called logistic regression analysis will also be used in this study to build a predictive model called the employability model. This model can assist the PWE in identifying the significant factors that need to be featured for them to increase their employment rate. This also helps employers in finding a suitable employee among PWE based on the types of the intelligence that they have.

1.3   Research Questions

This study is to answer the questions below:

1.   What is the intelligence profile of PWE based on the psychometric test known as the Ability Test in Epilepsy, ATIE$^{©}$ (2008)?

2.   What is the type of intelligence possessed by PWE and   their   employment
          status?

3.   How to develop an employability model which involves the significant
          factors that will lead to high employability?

4.   What are the significant factors that the PWE should have in order to enhance
          the chances of employability?

1.4   Research Objectives

As we can see, the main problem found in this study is the difficulties faced
by PWE in seeking employment. Therefore, the objectives of this study are:

1. To identify the intelligence profiles of PWE based on ATIE$^{©}$ (2008).

2. To determine PWE's type of intelligence and their employment status.

3. To develop an employability model which involves significant factors that
   lead to high employability.

4. To determine the significant factors for PWE high employability.

1.5   Scope of Study

The main purpose of this study is to identify the significant factors that
influence the employability of PWE based on the type of intelligence that they
possess. This study is a continuation of a previous study by Awang (2012), so that
the data used in this study is secondary data obtained from this previous work. The
study was conducted in two different hospitals which are Hospital Kuala Lumpur

(HKL) and Hospital Sultanah Aminah (HSA). A total of 148 samples found in HKL had been analyzed in the previous study by Awang (2012) while 67 samples were collected from HSA but were not analyzed in the previous study due to time constraints. Thus, the total samples that are used in this study is a combination of data collected from HKL and HSA for a total of 215 samples. The primary method used in this study is a logistic regression analysis that helps in building the employability model of PWE's.

1.6   Significance of Study

This study can contribute to four different parties including knowledge, human resource personnel (HRP), People with Epilepsy (PWE) and society.

1.   Knowledge

This study can contribute to the creation of new knowledge because it represents a new employability model using logistic regression that helps PWE to increase their probability to be employed by combining the eight types of intelligence based on the results obtained from the total score of their ATIE$^{©}$ (2008).

2.   Human Resource Personnel (HRP)

In HRP, this study can help HR personnel to identify the scope of work that suitable for the PWE based on the level of intelligence they possess. Additionally, the model developed in this study can help them understand the ability and intelligence of PWE so that they can place the PWE in suitable departments and can assign them suitable job specifications. In addition, HR personnel and executives can provide effective training for the PWE according to their intelligence type.

3. People with Epilepsy (PWE)

This study has applied a psychometric test called ATIE$^{©}$ (2008) which can assist the PWE to identify their actual strengths and weaknesses based on the type of the intelligence that they have. Knowing this helps them find a suitable career to be engaged in. A new approach called logistic regression analysis was applied to build an employability model in this study. This model makes a big contribution to PWE as it helps them understand their eight skills and enhances their opportunities in employment.

4. Society

This study also helps the society in enhancing their understanding towards the PWE and to treat the PWE equally. At the same time, it helps to reduce discrimination by society against people with epilepsy in terms of social, employment and marriage.

1.7 Research Approach

The study presented in this thesis can be divided into two main parts which are:

    i.   Descriptive analysis of the data

    ii.   Development of an employability model by logistic regression analysis

This study is a continuation study from the previous research by Awang (2008). The data used for this study are obtained from her previous work which was collected at the Department of Neurology, Hospital Kuala Lumpur (HKL) and Department of Neurology, Hospital Sultanah Aminah (HSA), Johor Bahru.

1.8   Research Limitations

The data used in this study are obtained from previous research by Awang (2008) which are collected from Department of Neurology, HKL and from HSA. Thus, the final sample was comprised of 215 patients, 148 from HKL and 67 from HSA. So, this study only analyzed the available data from these two hospitals.

The results from this study may not represent the whole population of PWE in Malaysia but it would still be a useful guide in understanding the intelligence of PWE in general and also helps the HRP and employers in assigning PWE with suitable tasks.

1.9   Conceptual and Operational Definitions

In this study, three main components are defined in two different terms which are conceptual and operational definitions as the following:

1.9.1   Conceptual Definitions

1.   Epilepsy

Epilepsy is one of the brain disorders to be described more than 3000 years ago and the word epilepsy is derived from the Greek word for 'attack'. People once thought that those with epilepsy were being visited demons or gods but the early physician, Hippocrates, suggested that epilepsy was a disorder of the brain and he was right. National Institute of Health (2013) defined epilepsy as a brain disorder in which clusters of nerve cells or neurons in the brain sometimes signal abnormally. Neurons normally generate electrochemical impulses that act on other neurons, glands and muscles to form human thoughts, feelings and actions.

2. Multiple Intelligence

Gardner (1983) defined multiple intelligence as a psychological theory about the mind. He proposed that intelligent behavior does not arise from a single unitary of the mind but from different kinds of intelligence which are generated from separate metaphorical pools of mental energy. Each of these pools enables the individual to solve problems or to create products that are valued within one or more cultural settings (Gardner, 2003).

The seven intelligences proposed by Gardner (1983) are linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal and intrapersonal with two more additional intelligences called naturalist and existential intelligence (Gardner, 1999). He also makes two claims. The first one is that human beings have all of these kinds of intelligence and the second claim is that due to genetics and the environment, no one has exactly the same profile of intelligence, not even identical twins as people's experiences are different (Gardner, 1983).

3. Employability

Yorke (2008) defined employability as a set of achievements of skills, understandings and personal attributes that makes graduates more likely to gain employment and be successful in their chosen occupations that benefits themselves, the workforce, community and economy. Employability is not only about gaining a job but it is more related to the capacity of the graduate to function in a job and be able to cope well between jobs and remained employed throughout his/her life.

1.9.2 Operational Definitions

1. Epilepsy

In this study, epilepsy is defined as a chronic, serious neurological disease present worldwide that is affected by several factors such as medical, socio-cultural

and also psychological factors that lead to poor quality of life (Lim *et al.,* 2013). There is one effective quality of life from this disease which is in terms of building a career. This is a major issue to be discussed in this study because based on previous research by Varma *et al.* (2007), PWE have high unemployment and underemployment rates. Furthermore, this study also discussed the main types of seizures which are generalized and partial seizures. Epilepsy and its perception from society, epilepsy in Malaysia and a focus on epilepsy and employment will also be included in this study.

2.   Multiple Intelligence

The definition of Multiple Intelligence in this study is more focused on the intelligence profiles of PWE which are Gardner's eight different types of intelligence namely, musical, bodily-kinesthetic, math/logic, spatial, linguistic, interpersonal, intrapersonal and naturalist. These MI helps the PWE to have better understanding about their skills and capability for completing a task and increases their confidence and self-esteem (Gardner, 1983).

3.   Employability

Employability in this study means the type of intelligence that is owned by PWE that can help them to improve their chances to be employed and in maintaining their employment. At the end of this study, an employability model will be built to help PWE to identify significant factors that influence their employment status. This model consists of a binary variable which is Employed or Unemployed. Employed here means the probability of PWE to be hired where the probability equals to 1 and Unemployed means the probability of PWE not to be hired where the probability is close to 0.

1.10   Research Framework

The overall framework for this study is divided into three stages as shown in Figure 1.1. The first stage consists of two chapters which are Chapter 1 and 2 that describe the introduction and the literature review of this study. The literature review is divided into two main components which are epilepsy and Multiple Intelligence (MI) theory. The topics discussed in the epilepsy section are type of seizures, epilepsy and society, epilepsy in Malaysia and epilepsy and employment while topics in the MI section are eight different types of intelligence which are linguistic, spatial, mathematical, interpersonal, intrapersonal, naturalistic, bodily-kinesthetic and musical intelligence.

The second stage of this framework presents Chapter 3 and Chapter 4 which include the methodology, analysis and results, respectively for this study. The methods used are a psychometric test called ATIE$^{©}$2008 and the logistic regression analysis that is to build the employability model. The instrument used has undergone required analysis processes such as pilot study, validity and reliability to ensure the usefulness of the instrument. The logistic regression analysis also consists of a few processes to support the model development such as odds ratio, Wald statistics, likelihood -ratio test, Cox and Snell R^2, Hosmer-Lemeshow test and model discrimination and calibration to make sure the model built is acceptable and can represent the results of this study. Lastly, the third stage consists of the last chapter which is Chapter 5 that discusses and concludes this study.

Stage 1
Introduction and Literature review

Stage 2
Analysis and Results

Stage 3
Discussion and Conclusion

Introduction
Chapter 1

Literature Review
Chapter 2

Epilepsy
- type of seizures, epilepsy and society, epilepsy in Malaysia, epilepsy and employment

Multiple Intelligence
- linguistic, spatial, mathematical, interpersonal, intrapersonal, naturalistic, bodily-kinesthetic, musical and existential

Research Methodology and Analysis and Results
Chapter 3 and 4

Instrument (ATIE©)
- Reliability test

Data

Logistic Regression Analysis
- odds, Wald statistics, likehood-ratio test, Cox and Snell R^2 and Hosmer-Lemeshow test

Descriptive Statistics

Employability Model

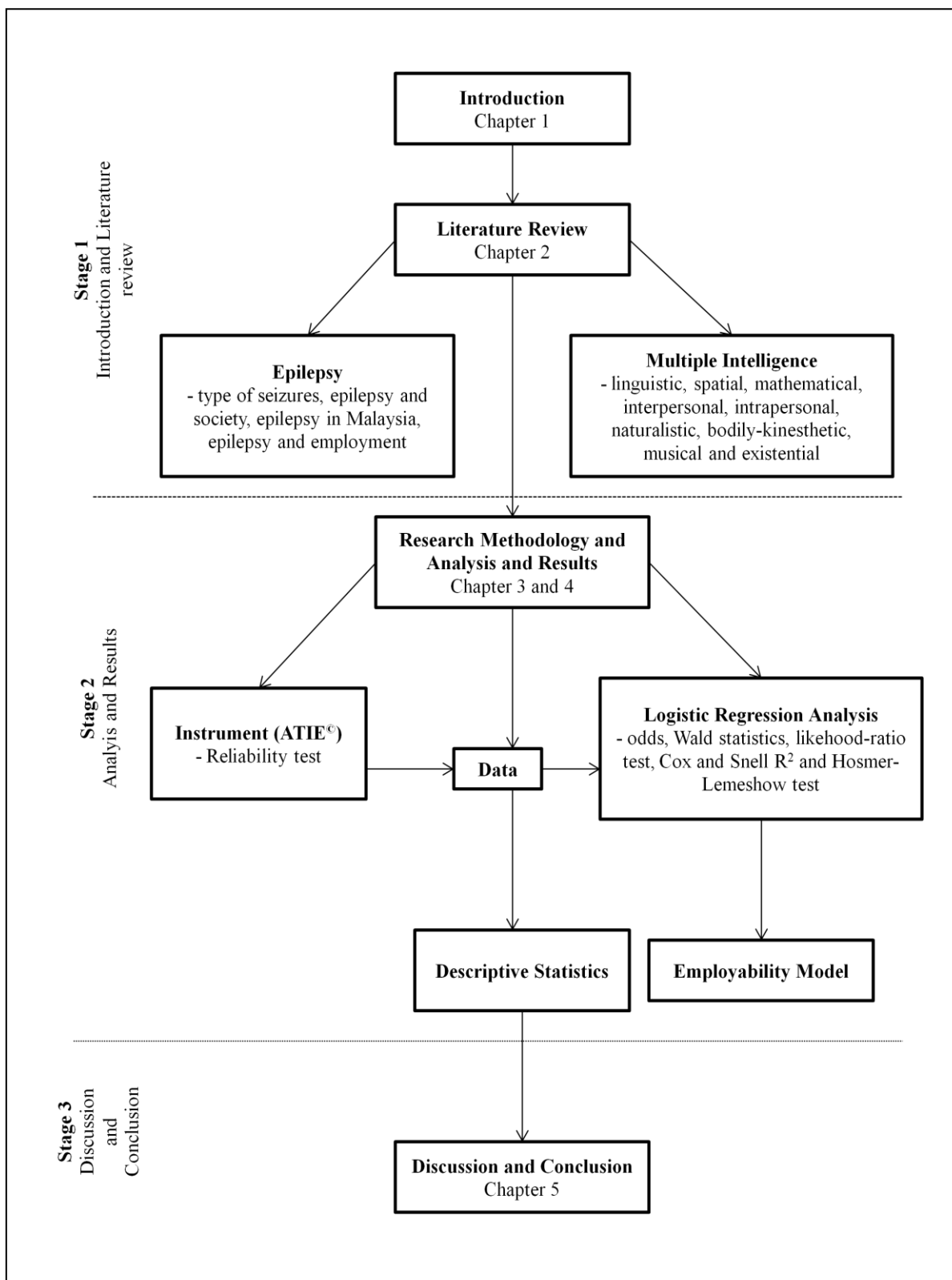**Discussion and Conclusion**
Chapter 5

Figure 1.1: Research Framework

1.11   Summary

By identifying factors that can increase the rate of PWE to be employed, it also indirectly gives exposure to PWE on the types of intelligence and natural talent achieved by them to help them in improving their standard of living. This is because employers favor employees based on their capability and ability.

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