Intergration of Multi-Group Analysis in Quality of Life using Structural Equation Modeling

Intergrasi Analisis Kumpulan Berbagai Kualiti Kehidupan menggunakan Model Persamaan Berstruktur

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Abstract

Stress is an unavoidable part of student's life. It can take a toll on students' physical health, mental wellness, and academic success and even on every part of life unless they discover to manage with it appropriately. This research is aimed to explore the quality of life related to the level of prevalence stress among students in public university. The main objective of this study are to investigate whether the components of quality life which are emotional intelligence, personal meaning profile, satisfaction with life and psychological well-being significantly influence the level of prevalence stress among Mathematics students in public universities. This study is conducted at University Malaysia Terengganu and University Technology MARA Kelantan. The data are analyzed by using Structural Equation Modeling (SEM) in order to test the main hypotheses of this study. The result of study shows that emotional intelligence and psychological well-being are significant in the model. Therefore, parents and the universities should play a role to help students cope with it.

Keywords   Multi-group analysis, quality of life, structural equation modeling

Abstrak

Stres adalah sebahagian daripada lumrah bagi kehidupan seorang pelajar. Stres memberi kesan kepada kesihatan fizikal, kesihatan mental, kejayaan akademik serta keseluruhan nilai kehidupan pelajar yang perlu mereka tangani secara baik. Kajian ini bertujuan bagi meneroka kualiti kehidupan pelajar yang berkait dengan tingkat tekanan yang mereka hadapi di universiti awam. Objektif utama kajian adalah bagi menganalisis sama ada komponen-komponen kualiti kehidupan iaitu kecerdasan emosi, profil erti kehidupan peribadi, kepuasan hidup dan kesihatan psikologi mempengaruhi tingkat tekanan yang dihadapi oleh pelajar matematik di universiti awam. Kajian ini dijalankan di Universiti Malaysia Terengganu dan Universiti Teknologi MARA Kelantan. Data kajian dianalisis menggunakan Model Persamaan Berstruktur (SEM) bagi menguji hipotesis kajian. Dapatan kajian menunjukkan kecerdasan emosi dan kesihatan psikologi adalah signifikan bagi model yang diusulkan. Justeru, ibu bapa dan penjaga serta universiti perlulah memainkan peranan membantu pelajar menghadapi stres sesama mereka belajar di universiti.

Kata kunci   analisis kumpulan berbagai, kualiti kehidupan, model persamaan berstruktur

INTRODUCTION

Structural equation modeling or also well-known as SEM has gained popularity across many disciplines in the past two decades due perhaps to its generality and flexibility (Zainudin, 2012). As a statistical modeling tool, SEM is widely applied in behavioral, social, and educational as well as economy, marketing, and medical researches (Raykov & Marcoulides, 2006). SEM is a statistical technique for estimating and examining the inter-relationships among variable simultaneously in a model. The inter-relationships among variables could either be correlational or causal relationships (Zainudin, 2012). There are two significant components in SEM which is measurement model and structural model (Eboli et al., 2012; Golob, 2003; Hoe, 2008; Zainudin, 2012). The measurement model describes the relationship among the latent construct and their indicators or response items, while structural model describes the inter-relationships among the latent constructs in the study (Byrne, 2010; Zainudin, 2012)

Based on Mapping of Youth and Youth Malaysia Index by Youth Development Research Institute of Malaysia Ministry of Youth and Sports (2006), found that youth experienced emotional stress, depression and stress that are quite serious. Stress among university students has been a topic of interest for many years. University students often live with an inordinate quantity of tenseness, which can have negative academic, emotional and health-related outcomes (Beck et al, 1997). In fact, stress can affect both students' health and academic performance when it is perceived negatively or becomes excessive (Campbell et al, 1992; Misra et al, 2000). Stressful academic events and other stressful life issues may negatively affect one's health-related quality of life in the physical and mental domains of life. Therefore, this research is to examine the internal factors of stress or conflict within individual itself because previous researches mostly focus on external factors likes financial, environment, and family. In addition, there are lacks research of stress on mathematics students at university. Moreover, there are no literature analyze the problem of stress using SEM. Then, SEM is employed to assess the factors of quality of life towards the level of prevalence stress among youths by examining the inter-relationship among latent constructs. The objectives of this study are:

1. To examine the latent constructs through measurement model.
2. To construct the best structural (path) model of quality of life.
3. To test the mediating effect of psychological well-being in the relationship between emotional intelligence and level of prevalence stress.
4. To test the mediating effect of psychological well-being in the relationship between personal meaning profile and level of prevalence stress.

METHODOLOGY

The target populations for this study was mathematics students of two different public universities that were University Malaysia Terengganu (UMT) and University Technology MARA (UiTM) Kelantan. This study applied descriptive research design to describe the characteristics of relevant groups which were mathematics students in the two different public universities. The sampling design used was simple random sampling technique

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because it has sampling frame from both universities. Students were randomly selected based on sampling frame. According to Krejcie and Morgan Table (1970), the suggested sample size from UMT was 237 students and 224 students from UiTM Kelantan. The structural equation modeling (SEM) is developed for analyzing the inter-relationships among multiple variables in a model that are Emotional Intelligence (EI), Personal Meaning Profile (PMP), Pychological Well-being (PWB), Satisfaction of Life (SL), and Stress (SC).

RESULTS

Assessment of Normality

Table 1 illustrates that all items measured for the skewness are within the range between -1.5 to 1.5, hence the data is normally distributed (Zainudin, 2012).

Table 1 Descriptive Statistics

Items of EI	Skewness	Items of EI	Skewness	Items of EI	Skewness
ei1	1.007	ei6	1.540	ei11	.893
ei2	1.037	ei7	.852	ei12	.718
ei3	1.060	ei8	1.051	ei13	.479
ei4	1.549	ei9	.931	ei14	.558
ei5	.889	ei10	.730		
Items of PMP	**Skewness**	**Items of PMP**	**Skewness**	**Items of PMP**	**Skewness**
pmp1	.319	pmp5	1.427	pmp9	.749
pmp2	.382	pmp6	.853	pmp10	.271
pmp3	.380	pmp7	.932	pmp11	.625
pmp4	1.135	pmp8	.518		
Items of PWB	**Skewness**	**Items of PWB**	**Skewness**	**Items of PWB**	**Skewness**
pwb1	.662	pwb6	.957	pwb11	.312
pwb2	.562	pwb7	.638	pwb12	.425
pwb3	.532	pwb8	.740	pwb13	.382
pwb4	1.008	pwb9	.520		
pwb5	.610	pwb10	.493		
Items of SL	**Skewness**	**Items of SL**	**Skewness**	**Items of SL**	**Skewness**
sl1	.590	sl4	.700	sl7	.652
sl2	.472	sl5	.563	sl8	.570
sl3	.561	sl6	.512		
Items of SC	**Skewness**	**Items of SC**	**Skewness**	**Items of SC**	**Skewness**
sc1	.108	sc4	.772	sc7	.786
sc2	.418	sc5	.496	sc8	1.305
sc3	.108	sc6	.369	sc9	.451

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Measurement Model: Confirmatory Factor Analysis

With Confirmatory Factor Analysis (CFA), any item that does not fit into its measurement model should be removed from the model. The assessment for each element is done as follows:

Assessment of Unidimensionality

The requirement had been achieved either through the item-deletion process or through setting the "free parameter estimate" (Fig.1). All the factor loading in this study above 0.6.
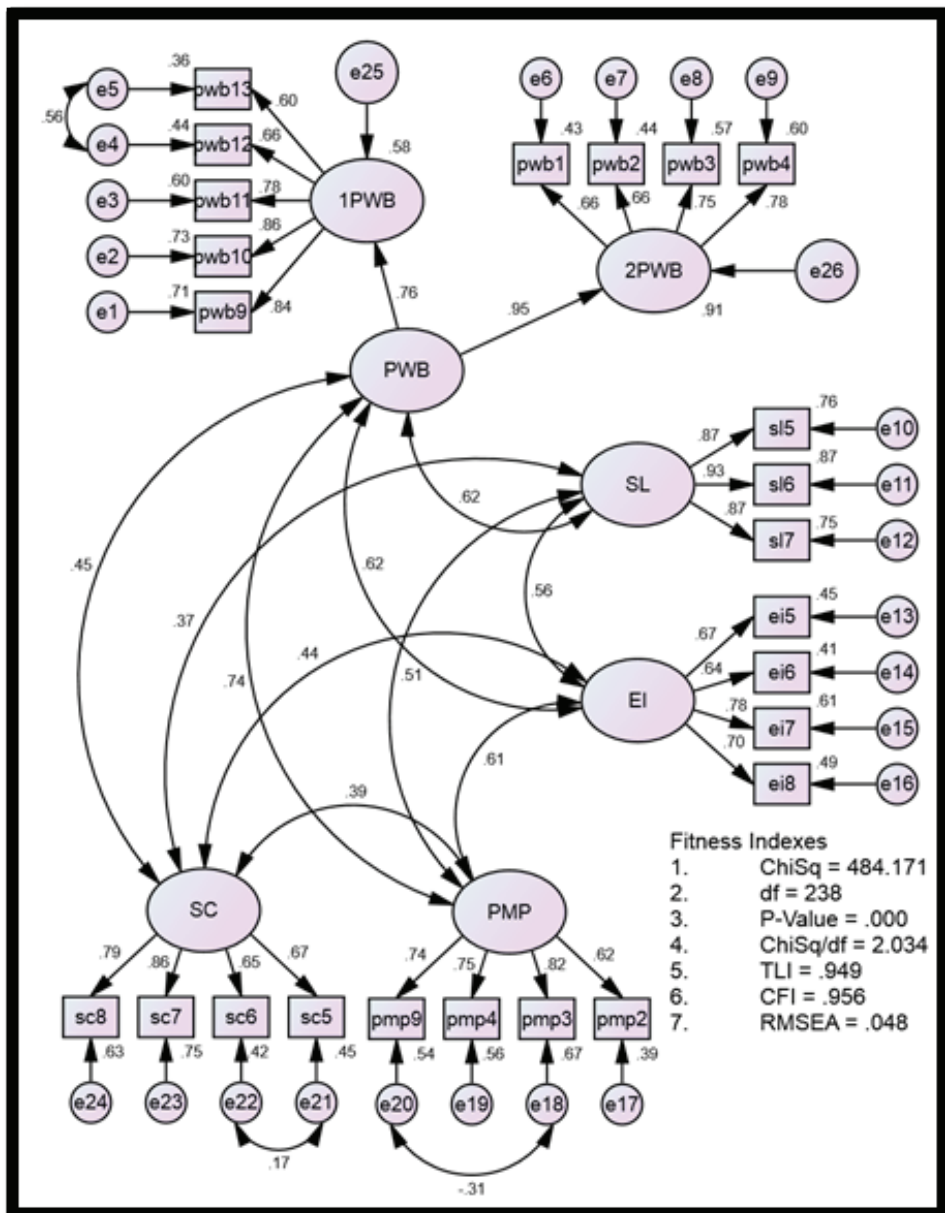

Figure 1   The Measurement Model for Pooled Constructs

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Validity and Reliability

The requirement of validity were achieved through two following processes which are construct validity as shown in Table 2 that all fitness indexes for the models meet the required level; and discriminant validity as shown in Fig. 1 that the redundant items are either deleted or constrained as "free parameter".

Table 2 The Assessment of Validity

Name of category	Name of index	Index value	Comments
Absolute fit	RMSEA	0.048	Accepted
Incremental fit	CFI	0.956	Achieved
Parsimonious fit	Chisq/df	2.034	Achieved

The requirement of reliability was achieved through all following processes which are internal reliability shows the value of cronbach's alpha greater than 0.7; the value of construct reliability greater than 0.6; and the value of average variance extracted greater than 0.5.

Table 3 The Assessment of Reliability

Items	Factor Loading	Cronbach Alpha (Above 0.7)	Construct Reliability (Above 0.6)	Average Variance Extracted (Above 0.5)
ei5	0.67			
ei6	0.64	0.791	0.794	0.500
ei7	0.78			
ei8	0.70			
pmp2	0.62			
pmp3	0.82	0.804	0.820	0.534
pmp4	0.75			
pmp9	0.74			
pwb1	0.66			
pwb2	0.66	0.802	0.806	0.511
pwb3	0.75			
pwb4	0.78			
pwb9	0.84			
pwb10	0.86			
pwb11	0.78	0.878	0.867	0.570
pwb12	0.66			
pwb13	0.60			
sl5	0.87			
sl6	0.93	0.918	0.920	0.793
sl7	0.87			
sc5	0.67			
sc6	0.65	0.836	0.833	0.559
sc7	0.86			
sc8	0.79			

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Structural Model: Path Analysis in SEM

The step of measurements model was achieved through the assessment of unidimensionality, validity, and reliability of the latent constructs. The next step is modeling these latent constructs into structural model.
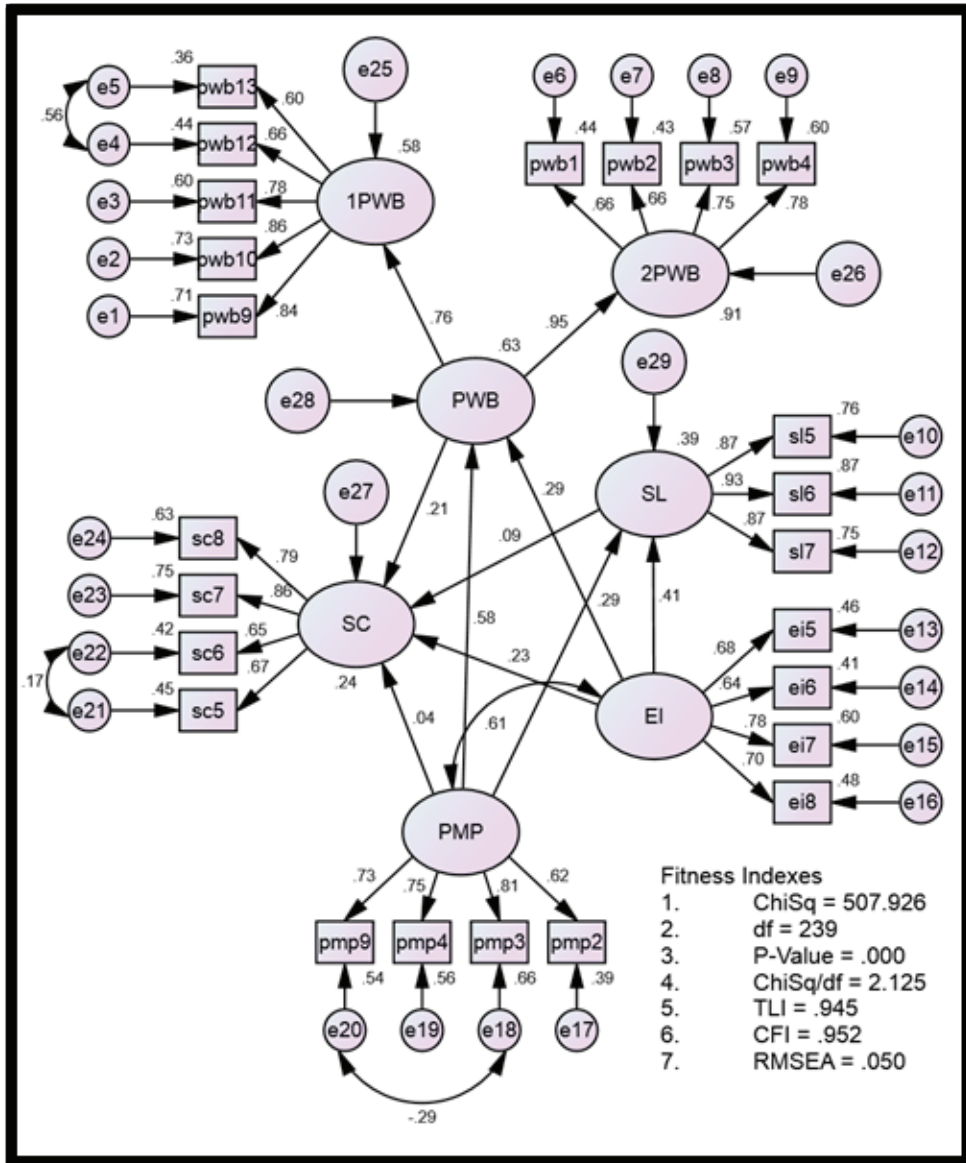

Figure 2 The Structural Model for Path Analysis

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ISSN 2462-2052

Table 4 Regression Weight

Variable	Path	Variable	Estimate	P-value	Result
SC	<---	EI	.217	.008	Significant
SC	<---	PMP	.033	.695	Not Significant
SC	<---	PWB	.180	.044	Significant
SC	<---	SL	.065	.152	Not Significant

From Table 4, since the P-value of Emotional intelligence toward prevalence stress is 0.008 and Psychological well-being toward prevalence stress is 0.044 which is lower than 0.05, therefore these path analysis are significant. Table 5 shows two hypothesis are supported in this study.

Table 5 Result of Hypothesis Testing

The Main Hypothesis Statement in the Study	Result
Emotional intelligence significantly influences level of prevalence stress.	Supported
Personal meaning profile significantly influences level of prevalence stress.	Not Supported
Psychological well-being significantly influences level of prevalence stress.	Supported
Satisfaction with life significantly influences level of prevalence stress.	Not Supported

Mediation Analysis

This study is to identify the type of mediator in the structural model. The mediator variable in this research is Psychological Well-being.

Table 6 Regression Weight

Variable	Path	Variable	Effect	Estimate	P-value	Result
PWB	<---	EI	Indirect	.289	***	Significant
SC	<---	PWB	Indirect	.214	.044	Significant
SC	<---	EI	Direct	.231	.008	Significant

Table 6 shows that there have a mediation effect. However, in calculation the value of indirect effect 0.289 x 0.214 = 0.062 less than 0.231 the value of direct effect, indicate that there have no mediation effect.

Table 7 Regression Weight

Model	Estimate	Result
Without mediator	.437	The value is reduced
With mediator	.258	

Table 7 shows the value of beta estimate is reduced from 0.437 to 0.258 when the mediator variable enter the model. Therefore psychological well-being has a significant mediating effect between emotional intelligence and prevalence stress. The type of mediation effect is Partial Mediation.

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ISSN 2462-2052

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Table 8 Regression Weight

Variable	Path	Variable	Estimate	P-value	Result
PWB	<---	PMP	.581	***	Significant
SC	<---	PWB	.214	.044	Significant
SC	<---	PMP	.038	.695	Not Significant

Table 8 shows that there have a mediation effect. Besides, the value of indirect effect 0.581 x 0.214 = 0.124 less than 0.038 the value of direct effect, indicate that there have a mediation effect. Therefore psychological well-being has a significant mediating effect between personal meaning profile and level of prevalence stress. The type of mediation effect is Full Mediation.

CONCLUSION

The main purpose of this study is to examine the internal factors involved in quality of life towards the prevalence stress which is personality meaning profile, emotional intelligence, satisfaction with life, and psychological well-being. There are four main hypotheses being proposed in this study. All of them are significant except the hypothesis of personal meaning profile significantly influences level of prevalence stress and satisfaction with life significantly influences level of prevalence stress are not supported.

ACKNOWLEDGMENT

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