Well-Being in Adolescence: Fitting Measurement Model

Azlina Abu Bakar and Abdul Fatah Wan Sidek

Abstract—Well-being has been given special emphasis in quality of life. It involves living a meaningful, life satisfaction, stability and happiness in life. Well-being also concerns the satisfaction of physical, psychological, social needs and demands of an individual. The purpose of this study was to validate three-factor measurement model of well-being using structural equation modeling (SEM). The conceptions of well-being measured such dimensions as physical, psychological and social well-being. This study was done based on a total sample of 650 adolescents from east-coast of peninsular Malaysia. The Well-Being Scales which was adapted from [1] was used in this study. The items were hypothesized a priori to have non-zero loadings on all dimensions in the model. The findings of the SEM demonstrated that it is a good fitting model which the proposed model fits the driving theory; (χ^2/df = 1.268; GFI = .994; CFI = .998; TLI= .996; p = .255; RMSEA = .021). Composite reliability (CR) was .93 and average variance extracted (AVE) was 58%. The model in this study fits with the sample of data and well-being is important to bring sustainable development to the mainstream.

Keywords—Adolescence, Structural Equation Modeling, Sustainable Development, Well-Being.

I. INTRODUCTION

ADOLESCENCE is known to experience depression and emotional instability. They encounter transitions that can place them at risk. Accordingly, the 9th Malaysia Plan has established the Education Development Master Plan (PIPP) 2006-2010 designed to achieve a holistic education system, progressive and moral. Among them is developing individual potential so that the overall balance of physical, emotional, spiritual and intellectual exist in youth. Human capital development based on the strength of faith and well-being will produce a new generation with strong physical and mental, as well as applying a positive attitude and build discipline among adolescents [2]. Adverse effects of stress and emotional instability can be restored with the strategy to build inner strength as a spiritual, religious and resilience in adolescents, as well as cognitive processes and attention from parents so that teens can obtain life satisfaction or well-being.

Transpersonal psychology has been referred to as the fourth force following psychoanalysis, behaviorism and humanistic psychology [3]. The major difference between transpersonal psychology and other theorist is that the transpersonal psychologists are concerned with the study of optimum psychological health including healing, self-actualization, well-being and they emphasize human consciousness [3].

This study also continues a line of research to further establish a base for Positive Psychology". Accordingly, this study will bridge a gap between the bodies of literature concerning Positive Psychology and well-being. Well-being was found to mediate the relationship between satisfaction with support and parenting satisfaction [4]. Psychological well-being promotes optimal parenting. Poor mental health and low perception of well-being may lead to burdensome physiological symptoms [5]. This means, positive perception of psychological well-being contributes to fewer physical problems.

Well-being is a positive and sustainable condition that allows individuals to survive or flourish in their life [6]. Well-being is related to happiness and considered to be an emotional construct involving an individual's cognitions regarding satisfaction with life overall, as well as positive and negative affects [7].

Social relationship promotes psychological well-being in adolescents and reduces malaise [8]. The social well-being is one of the indicators of well-being in this study. Previous studies found that there is a relationship between psychological problems and physical and social well-being [5]. Mothers with low level of well-being were less satisfied with their parenting role and were rated low on personal mood and sensitivity when interact with their child [4].

Well-being is not just the lack of disease or the absence of depression. Well-being is a state of complete mental, physical and social health. Well-being is also a predictor of academic success [9] and involves cognitive and psychosocial elements. Generating well-being among adolescents need to be addressed as they are a pillar of a nation and a generation that will shape society.

Structural Equation Modeling (SEM) is a multivariate statistical method and by using it, a researcher can construct theoretical concepts, test their measurement reliability, hypothesize and evaluate a network of relationships between variables.

Analysis of Moment Structures (AMOS) was used to test causal and measurement model in this study. AMOS involves a reflective measurement model where causality is from construct to the measures. AMOS is the combination of factor analysis and multiple regression analysis and it is used to analyze the structural relationship between measured variables and latent. Analyses of the measurement model and the path

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model are included in the SEM analysis. The measurement model is a conventional factor model and represents the observed variables that are some indicators of a set of latent variable [12].

The main purpose of this study is to evaluate reliability, validity and dimensionality of Well-Being Scales (WBS). Specifically, this study would like to determine whether the WBS is a well-fitted model in Malaysian context and addressed the following questions:
1. Does WBS have convergent validity?
2. Does WBS have discriminant validity?
3. Is WBS is a well-fitted model in Malaysian context?

II. METHODOLOGY

A. Sample

The total participants in this study were 650 representing 40% male and 60% female participants. All of them were 16 years old and randomly selected from secondary schools from form four in the east coast of peninsular Malaysia. Approved letter from Ministry of Education and State Department of Education was attached with the questionnaire. The questionnaire was group administered to the students during their regular class hours with permission from their school principals and teachers. The participants were given brief description of the research project and the process of informed consent was done.

B. Instrument

Well-Being Scale is a self-assessment instrument, adapted from [1]. Conceptualization of Well-Being Scale (WBS) is based on three factors; physical well-being, psychological well-being and social well-being. Back to back translation was done and was referred to two experts in English and Malay languages. The students were required to indicate their beliefs and conceptions of the well-being assessment of WBS on a five-point response scale (Strongly Agree, Moderately Agree, Agree, Disagree, Moderately Disagree and Strongly Disagree). Each statement was worded in a manner to capture the meaning attached to one of the three dimensions.

To assess the reliability of the instrument in this study, the researcher made use of estimate of composite reliability and average variance extracted, which are commonly used measure to test the extent to which multiple indicators for a latent variable belong together. Further confirmation of the overall fit of the measurement model using Confirmatory Factor Analysis (CFA) was obtained from the Maximum Likelihood estimation, Chi-Square (χ^2) statistics produced by AMOS, and various other goodness-of-fit criteria.

III. RESULTS

There was an acceptable level of model fit for the measurement model as suggested by [10, 11]. Further confirmation of the overall fit of the measurement model using CFA is obtained from the Maximum Likelihood estimation Chi-Square (χ^2) statistics produced by AMOS and various other goodness-of-fit criteria. Chi-square is the most common method of evaluating goodness-of-fit.

The ratio of χ2 to degrees-of freedom (df), should not exceed 3, adjusted goodness of fit index (AGFI) should exceed 0.8, non-normed fit index (NNFI) and comparative fit index (CFI) should exceed 0.9, and root mean square error of approximation (RMSEA) should not exceed 0.08.

The x^2 test of absolute model fit is sensitive to sample size and non-normality [12]. A better measure of fit is chi-square over degrees of freedom x^2/df). This ratio for the proposed model in this study is 1.268, which is within the suggested value while Goodness of Fit Index (GFI) was 0.994, CFI was 0.998 and Root Mean Square Error of Approximation (RMSEA) was 0.021. All the model-fit indices exceeded their respective common acceptable levels suggested by previous research, thus demonstrating that the measurement model exhibited a fairly good fit with the data collected.

The reliability of the survey instrument was established by calculating Cronbach's alpha for the purpose of measuring internal consistency. Most of the score was above the acceptable level, that is, above 0.70 as suggested by [13] while the convergent validity of the factors was estimated using composite reliability and average variance extracted. Convergent validity refers to the consistency that multiple items exhibit in measuring the same construct. Average variance extracted (AVE) and composite reliability (CR) are adequate indicators of the convergent validity of measurements [14]. Thus, they were included in the study. Composite reliability in the measurement model was above 0.7 as suggested by [15]. The average extracted variance was above the recommended 0.50 levels [16]. Convergent validity can also be evaluated by examining the factor loadings from the confirmatory factor analysis.

Discriminant validity is the degree to which items differentiate between constructs or measure different constructs [17]. Researchers used the criterion established by [16] to assess the discriminant validity. According to the criteria, in order for each construct to possess sufficient discriminant validity, the square root of AVE for every individual construct should be greater than construct's correlations with the other factors. Table I presents the result of the discriminant validity of the measured scales; the bolded values on the matrix diagonal represent the square root of AVE for each construct in the corresponding row, and the non-bolded values represent the correlations among each pair of constructs. AVE values are greater in all cases when compared with off diagonal elements in their corresponding rows and columns. This provides sufficient evidence for the discriminant validity of the scales used [16].

TABLE I
ASSESSMENT OF DISCRIMINANT VALIDITY

	WB	PSY	PHY	SOS
WB	**0.93**			
PSY	0.89	**0.89**		
PHY	0.72	0.66	**0.88**	
SOC	0.80	0.79	0.75	**0.94**

Diagonal elements represent the square root of the average variance extracted (AVE). *WB represents well-being; SOC represents social well-being; PSY represents psychological well-being; PHY represents physical well-being.*

TABLE II
GOODNESS OF FIT

Latent Variables (RBS)	χ^2/df	GFI	CFI	RMSEA
Adolescents' Well-being (n1 = 160)	2.41	.971	.939	.05
Adolescents' Well-Being (cross validation model) (n2 = 148)	2.38	.957	.978	.04
Adolescents' Resiliency (n3 = 605)	1.268	.994	.998	.02

All the items loaded significantly to the three factors. The direction and magnitude of the factor loadings were substantial and statistically significant. The model is free from offending estimates and the internal consistency estimates satisfied the standard deemed necessary in scale construction.

The goodness-of-fit results indicate the hypothesized model is consistent with the data (Table II). RMSEA has been recognized as one of the most informative criteria in covariance structure modeling. The RMSEA takes into account the error of approximation in the population [18].

To further validate the likelihood of the hypothesized model, cross validation was applied on the data collected from 160 and 148 students. The results of this analysis are presented in Table II in cross validation model shows the well-fitting model.

Values less than .05 indicate good fit and values as high as .08 represent reasonable errors of approximation in the population. For CFI (Comparative Fit Index) and GFI (Goodness of Fit Index), values close to 1.00 being indicative of good fit. Although a value of >.90 was originally considered representative of a well-fitting model, a revised cutoff value close to .95 has recently been accepted [19]. Because the CFA model focuses on the link between factors and their measured variables, within the framework of Structural Equation Modeling (SEM), it represents what has been termed a measurement model.

All items have non-zero loadings to the three factors. This means, all the items loaded significantly to the three factors. The direction and magnitude of the factor loadings were substantial and statistically significant. Analysis of the items

resulted in a well-fitting model; n = 650 (χ^2/df = 1.268; GFI = .994; CFI = .998; TLI= .996; p = .255; RMSEA = .021).

The model is free from offending estimates and the internal consistency estimates satisfied the standard deemed necessary in scale construction. Both the fit indicators, the GFI and CFI exceeded the threshold of .90, the standard deemed important for model fit [11]. Furthermore, the root mean square error of approximation (RMSEA=.02) indicated a well fitted hypothesized model. Therefore, the above results show that:

i. WBS has convergent validity.
ii. WBS has discriminant validity.
iii. WBS is a well-fitted model of adolescents in Malaysian context.

With regard to dimensionality of the WBS, the current findings indicate that the scale is multidimensional and second-order factor. All items loaded significantly to the three factors (psychological well-being, social well-being and physical well-being).

IV. DISCUSSION

Wilson (1967) summarized well-being as happy person, healthy, extroverted, optimistic, religious and high self-esteem [7]. This study can contribute to a better understanding of determining constructs of well-being, sustainable development and Positive Psychology which is promoted by Seligman and Csikszentmihalyi [7]. The promotion of well-being in adolescents can help reduce the onset of negative effects of mental illness [20]. The potential of applying positive psychology to enhance well-being has opened up new career opportunities for psychologists in coaching, counseling and consultation. Accordingly, the negative attributes will go away if people focus on enhancing the positives [21].

Promotion of students' well-being as key challenge of school has always been discussed in literatures. This study is also related to complete state model. Ryff and Keyes have combined some of the principles in explaining mental health. Among them are [22];

i. Emotional Wellbeing. Keyes used the term 'emotional well-being' to describe the 'subjective well-being'. It involves feeling positive, life satisfaction and the absence of negative elements in emotion. Subjective well-being is similar to the concept of well-being in this study.
ii. Social Welfare. This term involves aspects such as contributions to the community, coherence, social integration and the 'actualization'.
iii. Psychological Well-Being. This term reflects the acceptance of self, personal growth, which aims to live, adjusting to the environment, independent and positive relationship with others.

Promoting well-being is important in learning, education and sustainable development. Seligman describes five qualities to well-being; positive emotion, engagement, relationship, meaning and achievement. Well-being is often connected to happiness. Happier students may be more

enthusiastic about their education, less likely to miss class and more committed towards their academic success than unhappy students [22].

The results of the present study forward evidence for convergent and discriminant validity for well-being. Furthermore, the instrument demonstrated evidence of internal consistency reliability. The findings also show that the WBS is reliable and valid measures to be employed in assessing well-being among Malaysian adolescents. Evidently, the current study which made use of WBS in Malay version yields consistent findings with previous studies which used the English version of the measures. Therefore, WBS is a psychometrically sound measure s of well-being.

Future research should attempt to validate the findings of this study by testing more diverse survey participants within different contexts. Another limitation is that the data for this study was collected through a survey, therefore, allowing a potential of self-report bias from samples.

V. CONCLUSION

Well-being is related to teaching, education, learning and achievements. According to Allardt (1989), well-being is a state in which it is possible for a human being to satisfy his or her needs [23]. In sum, the indices indicated that the main observed variables measured the corresponding latent variable very well. This study has implications for educational and psychological practices. Since the items structure yields a valid and reliable structural model, the conception scale is therefore, useful in conducting diagnostic assessment of well-being among adolescents in Malaysia. Teachers, educators and parents with other professionals should have the competence to discover learning process that promotes well-being in school. Future research should examine whether the present findings generalize to other samples and settings.

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