MEASURING STUDENT ATTACHMENT TO SCHOOL : A STRUCTURAL EQUATION MODELING APPROACH

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Abstract: Schools are places where self-development and social interactions develop, inculcation of interpersonal skills and formation of peer groups among students (Henry & Slater, 2007). Relationships with schools are positively related to good mental health among adolescents and it is also a predictor of mental health in the future (Waters et al., 2009). This paper makes an attempt to ascertain and to test empirically, using the Structural Equation Modeling (SEM) to approach the Confirmatory Factor Analysis (CFA) of school attachment among adolescents in the east-coast of peninsular Malaysia. School Attachment Questionnaire (SAQ) was developed by Mouton, DeWitt & Glazier (1999) and was adapted by Trammel (2003). The adolescents' conceptions of school attachment measured dimensions such as general relationship, sense of belonging and specific attachment. The SAQ was administered to 308 secondary school students of 16 years old. Students were asked to respond to declarative statements with one of five responses : strongly disagree, disagree, don't know, agree or strongly agree. Cross-validation was done using two sub-samples of 160 and 148 students respectively. The instrument consisted of 20 items with 9 negative scores and the items were hypothesized as a priori to have non-zero loadings on all dimensions in the model. Analysis of the items resulted in a well-fitting model with composite reliability of .95 and variance extracted of 70% (χ^2/df = 1.036; p = .406; GFI = .991; CFI = .999; TLI = .999; RMSEA = .011, AIC = 34.290).

INTRODUCTION

There has been unprecedented growth in the field of sustainable development that involve social, psychological, community and economic development. Interest in sustainable development is growing rapidly in schools especially among adolescents since their behavior tends to be easily influenced by the environment they live in. This group is composed of young people who have to undergo a transition process from being a child to being and behaving likes an adult. Half of the present 1.2 billion youth in the world today are adolescents ranging in age from 15 to 19. The number of young people in this age group in Malaysia till mid-year 2010, is about 5.4 million which accounts for about 19.4% of the population of the country [4]. Since the population of adolescents in the country is quite big, concern over their well-being should be among the nation's top priorities.

One of the factors that contribute to sustainable development of adolescents in education is school attachment. Several studies show that school attachment directly affects students discipline on the functionality and effectiveness of a school [5]. A good relationship with the school will contribute to the academic development and positive behavior. Relationship with the school also plays an important role in determining student academic success and failure [6].

School attachment is commonly used to examine the relationship of students to school. Mouton and Hawkins (1996) also describes the term school attachment as a student report of the extent to which people at school liked them [6]. Attachment represents the emotional ties to the school [7]. Moody and Bearman (1998) also states school connectedness as part of the school attachment [8]. This includes identifying whether students are meeting with people at school, happy at school and feel part of the school.

Adolescents' appraisals of their school satisfaction is an independent predictor of their school engagement behaviors, regardless of their parent and peer relationships [9]. In addition, the relationship with the school will also contribute to adolescents' self-efficacy [6]. The study found that family relationships did not influence the lives of teenagers. This shows that adolescents prefer to seek support from outside. The study also found that the religious aspect did not have an impact on adolescent suicidal tendencies. Instead, social relations in school help them to encounter stress in life. The more positive perception of youth toward school, the less tendencies to commit suicide [10].

Schools that have students who involve in behavioral problems will impact the harmony and the school administration. Lack of interest toward the school has always been a source of youth changed schools and found to result in more serious behavioral problems [11]. Among the most common behavior problems of adolescents are truancy, substance abuse and disciplinary problems [5]. Problems of discipline in schools are due to academic failure, social rejection or hang out with problematic friends [12].

Peer support had a positive effect and peer victimization had a negative influence on school attachment [13]. Relationships with schools are also positively related to good mental health among adolescents and it is also a predictor of mental health in the future [2]. Furthermore, teachers' job satisfaction was positively contributed to students' attachment to school [13]. Therefore, school attachment is significant for creating a positive classroom environment.

Life satisfaction involves three aspects, namely the students' perception toward teachers, satisfaction with school and academic self-concept. According to Bandura, the school is where cognitive develops and generate a lot of knowledge in which cognitive skills regularly tested, evaluated and compared from a social perspective [14]. There are a number of school programs that emphasize school attachment such as Health Promoting School model (HPS) in Australia, Coordinated School Health Program (CSHP) in New York and the School Well-Being models which are applied in many youth activities. All models in these

programs emphasize the personal welfare of school youth [2]. Furthermore, attachment to school also predicts students academic achievement, with greater attachment associated with higher results in grade point average (GPA), regardless of ethnic differences [15]. This indicates that school attachment is vital in developing well-being of students and a powerful predictor of student health and performance in school.

The diversity of the population worldwide suggests a great need for cross-culturally validated research instruments. Researchers must have access to reliable and valid measures of concepts of instrument in their own cultures and languages (as cited in [16]). In order to conduct empirically fruitful future research involving school attachment, we need a psychometrically sound measure of school attachment scales. Previous studies investigating psychometric features of School Attachment Questionnaire (SAQ) involved English speaking samples. Local data pertaining reliability, validity and factor structure of SAQ are lacking.

Therefore, the present study attempted to evaluate and refine the model by combining analytic method of the School Attachment Questionnaire involving Malaysian samples. This study also attempted to fit data which is the most consistent with the three-factor model by cross-validated the proposed structures within and across cultures, using fit coefficients in order to find the strongest support for the three-factor model. The main purpose of this study is to evaluate reliability, validity and dimensionality of School Attachment Questionnaire (SAQ). Specifically, this study would like to determine whether the SAQ is a well-fitted model in Malaysian context.

MATERIALS AND METHODS

Sample

Sample size is an important consideration in Structural Equation Modeling (SEM) analysis, as low sample size has some disadvantages, including low power to detect significant path coefficients and sampling error in the covariance matrix, which can lead to reduction on fit indices [17]. Mueller (1999) suggested that the ratio of number of samples to number of observed variables should be at least 10 to 1 [17]. Bollen (1989) recommended a ratio of 3 to 5 samples per estimated parameter, whereas Bentler and Chou (1987) recommended 5 to 10 samples per estimated parameter [17]. In general, statistical indices will perform sufficiently and yield meaningful and interpretable values when the sample size is 200 or more samples [17].

Table 1: Measures of Goodness of Fit for the Measurement Model

Latent Variables (RBS)	$N_1 = 160$	$N_2 = 148$	$N_3 = 308$
df	6	6	8
χ^2	6.71	10.07	8.29
GFI	.98	.98	.99
CFI	.99	.99	.99
RMSEA	.03	.06	.01

Table 2: Standardized paths of a hypothesized model

Hypotheses	Causal Path		C.R.	Standardized Path Coefficient
H1	HUU	<--- SC	-	-
H2	PUN	<--- SC		***
H3	HUK	<--- SC		***
H4	SC1	<--- HUU		***
H5	SC2	<--- HUU	7.345	***
H6	SC3	<--- PUN	-	-
H7	SC4	<--- PUN	8.045	***
H8	SC5	<--- HUK	-	-
H9	SC6	<--- HUK	7.842	***

Note: *** = P < .0001

(sc1-sc6 represent observed variables; e1-e6 represent error variances; double-headed arrows depict correlations among factors; single headed arrow from factors depict factor loadings)
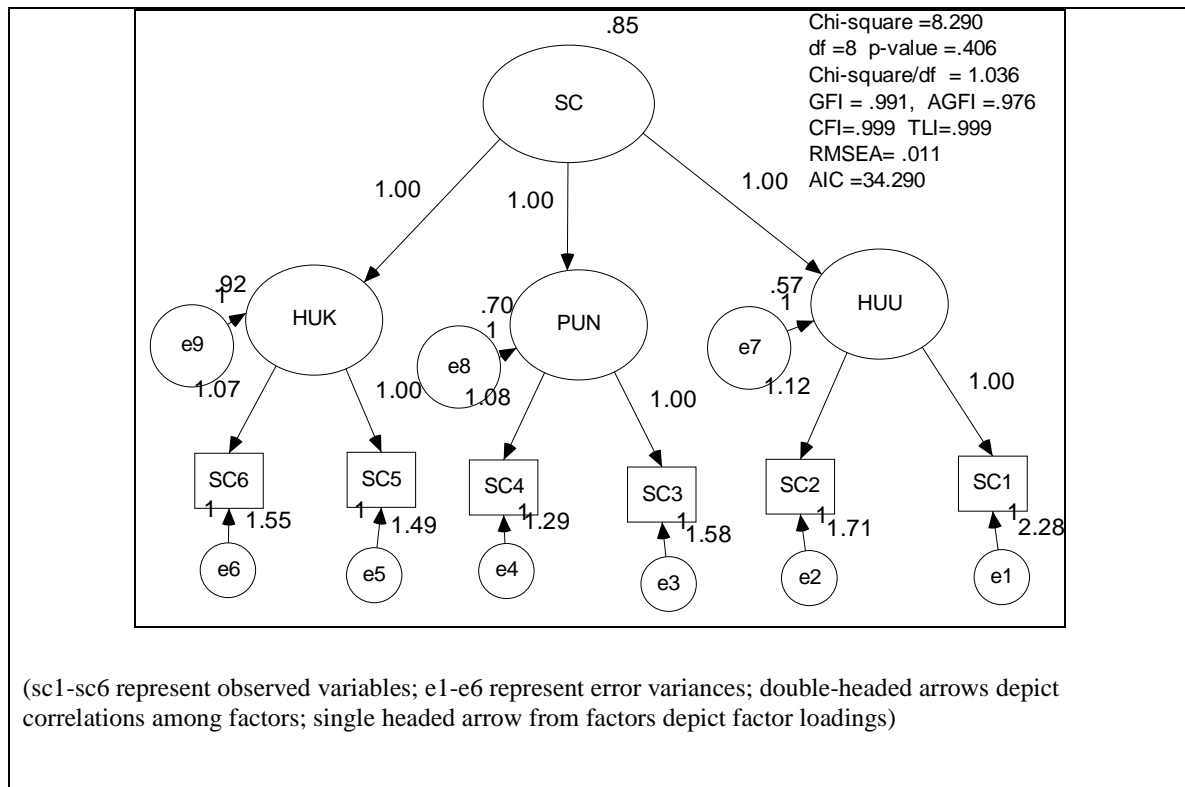
Figure 1: Adolescents' School Attachment of SAQ: The Hypothesized Model

The total samples in this study were 308 secondary school students of 16 years old. Students were asked to respond to declarative statements with one of five responses: strongly disagree, disagree, don't know, agree or strongly agree. After cleaning data, cross-validation was done using two sub-samples of 308 students. The groups of participant involved 160 and 148 students were randomly selected from two secondary schools in the east coast of peninsular Malaysia. Approved letter from Ministry of Education and State Department of Education were 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.

Instrument

The School Attachment Questionnaire (SAQ) is a widely used 20–item self-report measure of school attachment. This scale is based on Mouton, DeWitt and Glazier (1999) and was adapted by [3]. 39 items were selected from a pool of 82 items. After analysis of mean, standard deviation, item-total score correlations, factor analysis and reliability, 20 items were selected (De Witt, 1995). Exploratory factor analysis was conducted for the SAQ and found three factors related to the relationship with the school relationship in general, a sense of belonging and a specific attachment. Nine items are reverse coding. Range is between 20 and 100 with the .86 alpha coefficients [3].

Conceptualization of School Attachment Questionnaire is based on three aspects; general relationship (measures students' relationships at school in general), sense of belonging (measures students' feeling s of having a place at school or fitting in) and specific attachments (identify a particular aspect of school that students feel attached to) [3]. Students were asked to respond to declarative statements with one of five responses: strongly disagree, disagree, don't know, agree or strongly agree. Back to back translation was done and was referred to two experts in English and Malay languages.

Data Analysis

The main task in this model testing procedure is to determine the goodness of fit between the hypothesized model and the sample data. To arrive at the conclusion, a confirmatory factor analysis (CFA) was conducted on the hypothesized three-factor structure model using Analysis of Moment Structure (AMOS) version 16. Assessment of the measurement model involved confirmatory factor analysis (CFA).

CFA assessed the reliability and validity of the individual items and the overall measurement model [18]. The program adopted maximum likelihood estimation to generate estimates in the measurement model.

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. Byrne (2009) suggested the goodness of fit indexes are the chi-square (χ^2), the smaller the chi square, the better and p value greater than .05, Goodness of Fit Index (GFI) and Comparative Fit Index (CFI) are greater than .90 and the absolute fit of the model, Root Mean Square Error of Approximation (RMSEA) is below .08.

RESULTS AND DISCUSSION

In the analysis of data by using structural equation modeling (SEM), the researcher makes use of estimates of Composite Reliability (CR), Variance Expected (VE) and confirmatory factor analysis (CFA). The analysis for Composite Reliability (CR) resulted in high values of .95 and Variance Extracted (VE) of 70% which indicate that the indicators are really measure the latent.

All items loaded significantly to the three factors. Factor loading is the correlation of the variable and the factor. The factor loading must exceed .70 for the factor to account for 50 percent of the variance of a variable [18], as shown in Figure 1. Table 1 shows the goodness of fit indexes of confirmatory factor analysis (CFA) for the measurement model of adolescents' school attachment by using School Attachment Questionnaire. All the 20 items have non-zero loadings to the three factors.

Refer Table 2 for the maximum likelihood estimation. 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. ($\chi^2/df = 1.036$; p = .406; GFI = .991; CFI = .999; TLI = .999; RMSEA = .011, AIC = 34.290).

Figure I present the estimated three-factor model for adolescents' school attachment of SAQ, using the data from 308 samples. Items from each scale are assumed to load only on their respective latent variables. The overall fit of the 20-item measurement model is summarized in Figure 1. The goodness-of-fit results indicate the hypothesized model is consistent with the data. Root mean square error of

approximation (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 [19]. All the 20 items have non-zero loadings 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. Analysis sample and holdout sample were used in the cross-validation analysis.

Analysis of the 20 items resulted in a well-fitting model, n = 308 (χ^2/df = 1.036; p = .406; GFI = .991; CFI = .999; TLI = .999; RMSEA = .011, AIC = 34.290). Both the fit indicators, the GFI and CFI exceeded the threshold of .90, the standard deemed important for model fit (Byrne, 2009). Furthermore, the root mean square error of approximation (RMSEA = .03) indicated a well fitted hypothesized 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]. 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.

To further validate the likelihood of the hypothesized model, a second confirmatory factor analysis (cross-validation) was applied on the data collected from 148 students. The results of this analysis is presented in Table 1 in cross validation model shows the well-fitting model (χ^2 = 10.07; *df* = 6; GFI = .98; CFI = .99; RMSEA = .06).

The third validation was done, N= 308 to further validate the confirmatory factor analysis. The results of the analysis is presented in Table 1 shows that analysis of the items resulted in a well-fitting model (χ^2/df = 1.036; p = .406; GFI = .991; CFI = .999; TLI = .999; RMSEA = .011, AIC = 34.290). Therefore, the above results show that all items loaded significantly to the three factors and a well-fitted model of adolescents in Malaysian context. This study yielded strong psychometric data to support a three-factor model to measure school attachment. This study produced results which corroborate the findings of a great deal of the previous work in this field such as [6]. The literature demonstrated that school attachment plays a vital role in the success or failure of students. However, what was missing was a clear conceptualization of school attachment [6]. Evidence from this study provides support for the concurrent and discriminant validity of SAQ. Reliability of the SAQ appears to be good. A qualitative study done by Mouton and Hawkins (1996) resulted in nine categories as important in understanding school attachment from the perspective of the low-attached students [6]. The categories included perception to their level of attachment, how they felt in school, peer relationships, what they liked or disliked about school, reasons they came to school, relationship with school personnel, how their teachers felt about them and long term educational aspirations. All of these categories are included in the SAQ.

This is the first cross-cultural study that has developed a fitted model for School Attachment Questionnaire that is based on Malaysian culture by using Structural Equation Modeling. Each component of the measuring system is functioning to specification. The model also exhibits excellent psychometric properties. The instrument would be useful to researchers and educational psychologists in Malaysia as it provides an important tool for assessing attachment in school. With regard to dimensionality of the SAQ, the current findings indicate that the scale is multidimensional and second-order factor. All items loaded significantly to the three factors (general relationship, sense of belongingness and specific attachment).

The initial three-factor solution was subsequently tested using CFA to determine the degree to which the model fit the data. All the items loaded significantly to the three factors. The CFA also demonstrated that although there are strong correlations among the factors, the three separate factors are distinct and explain equally large proportions of the variance in the data. Despite the promising evidence of measurement model of SAQ, it should be tested further with a range of other importance measures across wider cultural settings. The SAQ (Malay version) does appear to exhibit reasonable levels of convergent and discriminant validity for research purposes. Therefore, this study makes a concrete contribution to the field of educational research in Malaysia by proposing a validated measure to assess school attachment.

CONCLUSION

Malaysian government believes that sustainable development is a key responsibility for human development, and schools have a significant role in developing sustainable students. Therefore, Ministry of Education should redesign a new curriculum and make sustainability a prior in their improvement plans to firmly embed in the curriculum. The

curriculum should be able to develop training that ensured teachers understood how they could contribute to cultivate a sustainable school. Schools are places where self-development and social interactions develop, inculcation of interpersonal skills and formation of peer groups among students [1].

Present findings show that the SAQ is a reliable and valid measure of school attachment among adolescents in Malaysia. The study contributes to the development of a psychometrically sound instrument to assess adolescents' school attachment of School Attachment Questionnaire. The results of the confirmatory factor analysis support the assertion that the conception is a multidimensional construct. This finding is in support with previous studies of school attachment of assessment, which in English version [3, 20]. Further studies which facilitate school attachment, contribute to intellectually challenge students and support them emotionally should be administered. Future research should examine whether the present findings generalize to other samples and settings. Furthermore, it is important to use the local version of SAQ in the future research because many people feel more comfortable in expressing their feelings in their own language as compared to a foreign language.

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