

Original Paper

Validating the University Student Engagement Model through Structural Equation Modeling

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Abstract

The main purpose of this study is to investigate whether emotional, cognitive and behavioral engagements, represents three conceptually and empirically distinct psychological constructs when studied within the same domain. This paper reports part of the findings from a major study entitled “Predictors of Self-Handicapping Behavior among Muslim Students”. Testing for factorial equivalence of scores from a measuring instrument was carried-out through structural equation modeling by using AMOS version 16. Results of Confirmatory Factor Analysis of responses from 790 undergraduates prove that the SEM three factor model of University Student Engagement (USE) is empirically fit and reliable, which also supports the argument that emotion, behavior and cognition are the student engagement manifestations of an interrelated constellation of academic student engagement.

Keywords

validity, University Student Engagement, measurement model, CFA

1. Introduction

University Counseling Units provide various mental health and other services within the university environment. The need for more counseling services within the universities can be identified from students' level of stress, depression, worries, anxiety, sadness, low self-esteem, low academic achievement and immorality, which all indicate the existence of disengagement among students. Newman (1992), argued that students attend class but with little excitement, commitment and pride in mastering the curriculum. The Cooperative Institutional Research Program (CIRP, 2002) of the UCLA Higher Education Research Institute commented that many college students were awarded superior grades in high school without learning how to study. They reported that, more than 60% of new undergraduates spent less than 6 hours per week studying, even though 90% earned a high school grade

point average of B or higher. And they concluded that, inadequate study habits create enormous stress, whereby the signs of stress predict the practicing of self-handicapping behaviour and academic disengagement. The same has been observed in the Islamic institutions.

Multicultural Counseling has shown factors like culture, gender, identity and religion as important aspects of wellbeing (Fuertes & Gretchen, 2001; Sue & Sue, 2003; Pederson, 2007). Muslim population is rapidly growing especially in the western world, thus counselors increasingly encounter Muslim clients, with little knowledge on Muslims and their communal life. Therefore, understanding how Islamic aspects can be integrated in counseling Muslim clients is of great importance. This importance is very much related to the Muslims' behavior which is often related to religious concerns or Islam as their frame of reference in dealing with cognitive, emotional and behavioral issues and concerns therefore, we have decided to focus our study on a population of Muslim students.

One's behavior is in accordance to ones belief about oneself (Woods, 1998) hence, academic self-concept is critical in the academic growth of the student because it has a direct effect on college performance, parents' and community expectations, student's future career, as well as his/her lifestyle and successes. This paper reports part of the findings from a major study entitled "Predictors of Self Handicapping Behavior among Muslim Students". Thus, the main goal of this study is to share the study which is on the edge of methodological development. We take the advantage of latest analytical approaches and new computer software development which allows us to apply new methods of analysis thus, contribute to the solutions of educational, psychological and counseling issues as well as improved analysis.

To be specific, the present study aims at investigating whether student engagement which is represented by three engagement constructs, i.e., emotional, cognitive and behavioral engagement, represents three conceptually and empirically distinct psychological constructs when studied within the same domain; the nature of relationship existing between the three inter-related constructs of student engagement; and the fitness of the measurement model of University Student Engagement (USE). Survey was conducted to Muslim undergraduates' so as to identify their self-concept on students' emotional engagement, behavioral engagement, cognitive engagement and religious engagement, but due to controversial issues on religious aspects the study excluded the religious construct. Results proved that, the three factor measurement model of USE is empirically fit and reliable, consequently it also prove the reciprocal interaction between emotion, behavior and cognition.

The significance of this study provides a proof of reciprocal interaction theory of Albert Elis (1993) which claims for a reciprocal interaction between emotion, behavior and cognition. Our study proves the significance influence of emotion, behavioral and cognitive aspects on each other in the process of student engagement. Information on how academic engagement varies between the three categories of engagement has both theoretical and practical implications for both educators and counselors including student counselors and student psychologists who are interested in understanding student's behavior and appropriate action to be taken.

The general purpose of this study is to add to the existing knowledge about student engagement. Many educators have become dissatisfied with student engagement, whereby an engaged student is expected to show sustained behavioral involvement in learning activities accompanied by a positive emotional tone (Finlay, 2006). Unfortunately, many changes experienced among students have been found to have a negative influence on their efficacy, which includes practicing academic self-handicapping behavior, decline in academic self-concept and decline of academic motivation and engagement. The main purpose of this study however, is to develop the measurement model of student engagement (USE) on the data derived from undergraduate students in an ongoing co-curriculum compulsory course. The result of which can be utilized by Researchers, Counselors, Psychologists and Students in studying issues pertaining to student engagement.

In this study, student engagement is defined according to the definition from the study of research report written by Finlay (2006) on “Quantifying School Engagement” at the center for School Engagement in Colorado, USA. Students are expected to show sustained behavioral involvement in learning activities accompanied by a positive emotional tone, select tasks at the border of their competencies, initiate action when given opportunities and make intense effort and concentration in the implementation of learning tasks. They are also expected to show positive emotions during ongoing actions including curiosity, interest, enthusiasm and optimism. Thus the three categories of engagement in this study are defined as:

- **Emotional Engagement:** relationships with lecturers, colleagues, academics, faculty, university as well as willingness to work.
- **Behavioral Engagement:** participation in the university related activities, academic and learning tasks, positive conduct and absence of disruptive behaviors.
- **Cognitive Engagement:** investment in learning and a willingness to go beyond the basic requirements to master the difficult skills.

2. Theoretical Underpinning of the study

Cognitive Behavioral Therapy (CBT) is a psychotherapy based on cognitive assumptions, beliefs and behaviors aiming at influencing negative emotions that relate to inaccurate appraisal of events (Albert Ellis, 1993). He assumes that “cognitions, emotions, and behaviors interact significantly and have a reciprocal cause-and-effect relationship”. This has also been proven in a scientific study of Wayne, Drevets, Marcus, and Raichle (1998), entitled “Reciprocal Suppression of Regional Cerebral Blood Flow during Emotional versus Higher Cognitive Processes”. They claim that “the possibility that neutral activity in some cognitive-processing areas is suppressed during intense emotional states, suggests mechanisms by which extreme fear or severe depression may interfere with cognitive performance”, and our study assume this occurrence may influence student engagement by developing self-handicapping behavior. In another scientific study on the relationship between emotion and cognition, Pessoa (2008, p. 153) suggested that, “The cognitive control system guides behavior while maintaining goal-related information”. Thus, cognitive behavioral therapy is much more commonly used in the field of Academic

clinical psychology (Jones & Butman, 1991), which is therefore, the most appropriate counseling theory in studying student engagement.

REBT is considered as the parent of the present CBT. Historically, Albert Ellis developed Rational Therapy in 1955 (Corey, 2006) which soon changed to Rational Emotive Therapy (RET) and finally, to Rational Emotive Behavior Therapy in 1993 (Ibid, 2006). In this theory, the client learns how to identify irrational beliefs and learns to replace it with rational belief hence, considered as an educative process. The researcher believes that one needs to engage himself/herself religiously or spiritually so as to identify his/her irrational beliefs and replace with the rational beliefs hence, the study is carried out at the International Islamic University Malaysia.

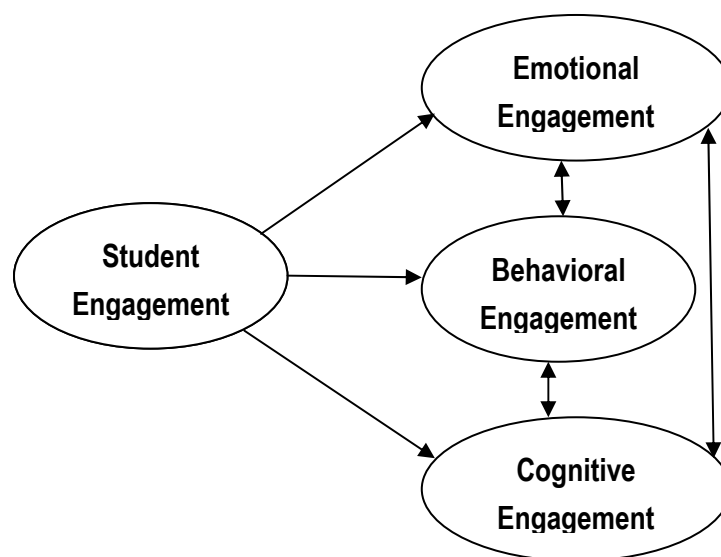


Figure 1. University Student Engagement (USE 2012) Model

From theories and counseling practices, the researcher considers the existence of the reciprocal interaction between cognitive, emotional and behavioral student engagement. This assumption led into the formation of the theoretical model of this study (Figure 1), which suggests an existence of the reciprocal interaction between emotional engagement, cognitive engagement and behavioral engagement.

2.1 The Alternative Hypothesis Derived from the Framework Dates That

H1: Each of the three constructs which represent EE, CE and BE instruments indicates high convergent validity and adequate fit indices.

H2: There is a significant inter-relationship between emotional, cognitive and behavioral engagement of undergraduates.

H3: The three factor model of University Student Engagement (USE) adequately represents students' responses.

3. Methodology

This is a theoretical study which deals with model building, assessment and evaluation through structural equation modeling. It involves a confirmatory two-step approach theory testing and development using Maximum Likelihood Estimation method which is the method of testing the parameters of a statistical model. MLE has been selected because it corresponds with many statistical estimation methods whereby it selects the set of values of the model parameters which maximizes the likelihood function. SPSS (Statistical Package for Social Science) version 16 and AMOS (Analysis of Moment Structures) Version 16 has been applied in conducting individual construct analysis group analysis and invariance analysis. In the first step, the three constructs of the measurement model of University Student Engagement model were assessed through PCA and CFA, whereby all three student engagement constructs (emotion, behavior and cognitive) proved to be fit and reliable. In the second step, the individual constructs were assessed as a group of constructs by embedding the three university student engagement constructs together as a measurement model of USE before assessing its fitness in the form of first and second order measurement models.

3.1 Sample

From our target population of 1,032 undergraduate students of International Islamic University Malaysia (IIUM), only 832 responded and only 790 students followed the instructions and filled in the survey report correctly and completely thus, 42 samples were discarded due to either incorrectly filled in questionnaire or partially filled or unfilled. Therefore, the total sample included in the final analysis is 790 undergraduate students, 272 (34.4%) are male and female students are 518 (65.6%). These percentages almost resemble the overall admission of IIUM which is 40% male students and 60% female students. Age range of the respondents is between 18 years and 29 years whereby the majority are 20 years old (75.1%) followed by 21 year olds (14%), 23 years (4%), 19 years (3.8%), 22 years (3.4%), and the rest are less than 1%. This age range is very appropriate in studying self-handicapping behavior which according to most of the previous studies reported that self-handicapping behavior mostly occurs between the ages of 18 and 25 years.

3.2 Student Engagement Questionnaire (SEQ, 2011)

As indicated in appendix A, Student Engagement Questionnaire (SEQ, 2011) has been adapted from a school engagement scale which was developed from the 3 domains of the school engagement, extracted after the Confirmatory Factor Analysis (CFA) of the student engagement questionnaire. According to Finlay (2006), the original questionnaire was developed for the intensive sites of USA, by the National Center for School Engagement (NCE, 2006). In a report of a study entitled Quantifying School Engagement, Finlay (2006), explained the process by which NCE (2006) created the school engagement survey as well as the reliability and validity of the instrument. Good result was obtained, whereby all the three constructs were between Cr Alpha 0.79 and 0.92 except for the behavioral engagement at one of the schools (Jacksonville) which was 0.50. Our instrument adapted all the three variables but with some modifications where the context in the present questionnaire differs from the previous studies (Converse

& Presser, 1986).

To be precise, the dimensions of the original instrument have been maintained but the researcher modified some of the phrases and also changed all the negatively worded items to positive items. The reason for making all items positively worded is to avoid leading the respondents in identifying and correcting the statement before answering which would lead to unclear presupposition (Foddy, 1993). In addition, the researcher added the demographic section which included the respondent's age, nationality, Gender. The scale of SEQ (2011) is between 1 and 7, i.e., from disagreeing very much to agreeing very much. The middle category has been avoided according to the suggestion of Converse and Presser (1986) who argues that the by adding the middle point, the real direction which the respondents lean on, will be lost. In the main study, the SEQ (2011) has been applied as dependent variables and predictors of self-handicapping behaviors whereby a negative influence is assumed.

This study applies the multivariate method of analysis which is Structural Equation Modeling where a full Latent Variable (LV) model specifies a relationship of the indicators to the LVs as well as the interrelationships between the LVs. Application of interval scales within this study, allows the estimation of error variance of each individual indicator and thus, the estimation of interrelationships among the LVs are not biased by the presence of error in the indicator. The total items included in the present study are forty four in order to ensure higher reliability.

4. Data Screening of SEQ

Descriptive statistics of all 44 items of SEQ (Student Engagement Questionnaire) was done from the whole sample (790). The score of means were noted from 7-points Likert scale ranging from 3.88 to 6.78 and the standard deviations from 0.862 to 2.086. The statistical value (z) of the skewness and kurtosis fell below the threshold point of the skewness (-3 to +3) and kurtosis (-10 to +10) as noted by Kline (2011), except for one item which was removed. The reliability estimates for internal consistency for 44 items of the three scales (N=790) are: emotional engagement-Cr. 0.88, behavioural engagement-Cr. 0.81 and cognitive engagement-Cr. 0.84 from a scale of 1-7. Thus based on the result of descriptive statistics, SEQ was considered to be a highly reliable instrument. And which is inconsistent with the findings of previous studies as reported by Finlay (2006).

4.1 Test of Critical Assumptions in Factor Analysis

Prior to performing Confirmatory Factor Analysis, the suitability of data for factor analysis was assessed during the pilot study by testing the critical assumptions in factor analysis whereby the result of Kaiser-Meyer-Olkin and Measure of sampling adequacy for all the three scales of student engagement were more than 0.8 while normal KMO is ≥ 0.6 therefore our findings indicate an adequate measure of all the three scales. Bartlett-Sphericity test revealed that the three scales of student engagement are statistically significant with P-values of 0.000, whereby significant Bartlett's Tests of Sphericity is ≤ 0.05 (Pallant, 2005, p. 182).

Table 1. KMO and Bartlett's Test of the 4 Scales of POASH

SCALES OF USE MODEL	Sample size	KMO	Chi-square	df	Significance
Emotional Engagement Scale	790	.888	4.44	91	.000
Behavioral Engagement Scale	790	.822	2.99	91	.000
Cognitive Engagement Scale	790	.863	3.92	120	.000

This suggested that Factor analysis is appropriate and the sample size adequate for meaningful factorability (Pett, Lackey, & Sullivan, 2003). Thus, Principal Component analysis of all the four scales in our study was carried out so as to select items for Confirmatory Factor Analysis through Structural Equation Modelling. Items were determined from the results of Component Matrix as indicated in the three tables depicted in section 2-4.

Table 2. Emotional Engagement Component Matrix

	Component		
	1	2	3
ee1	0.511	0.662	
ee2	0.549	0.654	
ee3	0.519	0.62	
ee4	0.611		
ee5	0.697		
ee6	0.74		
ee7	0.589		
ee8	0.707		
ee9	0.563		-0.492
ee10	0.516		0.508
ee11	0.724		
ee12	0.719		
ee13	0.688		
ee14	0.621		

Extraction Method: Principal Component Analysis.

Table 3. Behaviour Engagement Component Matrix

	Component			
	1	2	3	4
be3	0.739			

be6	0.676	-0.431		
be14	0.668			
be5	0.642	-0.556		
be2	0.597			
be4	0.569			
be10	0.552			0.404
be9	0.548		-0.42	
be8	0.545		-0.42	
be11	0.51			
be12	0.458	0.6		
be13	0.467	0.595		
be7				0.571
be1	0.459			-0.532

Extraction Method: Principal Component Analysis.

Table 4. Cognitive Engagement Component Matrix

	Component			
	1	2	3	4
ce5	0.673			
ce15	0.656			
ce3	0.638	-0.443		
ce9	0.605			
ce8	0.6			-0.459
ce4	0.597	-0.516		
ce12	0.586	0.507		
ce14	0.578		-0.573	
ce6	0.528	-0.435		
ce2	0.503	-0.473		
ce1	0.501	-0.409		
ce16	0.498			
ce11	0.492	0.438		
ce7	0.444			-0.43
ce10	0.468	0.494		
ce13	0.556		-0.586	

Extraction Method: Principal Component Analysis.

According to the results of component matrix (Tables 2-4), all three scales of student engagement consists of more than two components however, Items in components No: 2-4 of all the three scales are cross loading with other factors, the only component with more factors which are not cross loading are in the first component of all the three scales. Thus, all three scales were fixed at one factor extraction and all the 44 items of student engagement scale were analysed using the Varimax rotation where the factor loadings of less than 0.4 were deleted.

Tables 2 to 5 highlights retained and deleted items from the three scales of student engagement. The results indicate emotional (Table 5) and cognitive scales (2.7) maintained their items but, behaviour engagement scale (Table 6) lost one of its item, i.e., BE 7 = I stay at home after the lecture hours. However, according to this result as well as the proposed theory of reciprocal interaction between EE, BE and CE, the researcher restricted all three scales into single components.

Table 5. Emotional Engagement Scale

ITEM	EMOTIONAL ENGAGEMENT SCALE	Item Loading
EE6	I like most of my Lecturers at the university.	.740
EE11	Most of my lecturers understand me.	.724
EE12	I feel excited by the academic work at the university.	.719
EE8	Most of my lecturers care about how I'm doing.	.707
EE5	The Lecturers at my university treat students fairly.	.697
EE13	My lecture room is a fun place to be.	.688
EE14	I feel I can go to my lecturers with the things that I need to talk about.	.621
EE4	I am happy to be at my university.	.611
EE7	The discipline at my university is fair.	.589
EE9	Most of my lecturers know the subject matter well.	.563
EE2	When I first walked into my university I thought it was Friendly.	.549
EE3	When I first walked into my university I thought it was Clean.	.519
EE10	There is an adult at University that I can talk to, about my problems.	.516
EE1	When I first walked into my university I thought it was Good.	.511

Note. The alpha reliability = 0.87.

Table 6. Behavioral Engagement Scale

ITEM	BEHAVIORAL ENGAGEMENT SCALE	Item Loading
BE3	I always follow the university rules	.739
BE6	I am never absent at the university without a genuine reason	.676
BE14	I always obey university dress code	.668
BE5	I never skip classes	.642

BE2	I work very hard when I am in the lecture room	.597
BE4	I never get in trouble at the university	.569
BE10	I regard all my colleagues equally no matter which country they came from	.552
BE9	I respect most of my lecturers.	.548
BE8	I enjoy the work I do in class	.545
BE11	I always avoid gossiping	.510
BE13	I hate to see two people fighting	.467
BE1	I never thought of dropping out of the university	.459
BE12	I try to avoid arguments	.458
BE7	I stay at home after the lecture hours (Deleted)	Deleted

Note. The alpha reliability = 0.826.

Table 7. Cognitive Engagement Scale

ITEM	COGNITIVE ENGAGEMENT SCALE	Item Loading
CE5	I am getting a good education at my university	.673
CE15	I try my best at the university	.656
CE3	What I learn in the university is very important for my future life	.638
CE9	When I read a book, I ask myself questions to make sure I understand what it is about	.605
CE8	Most of my courses are very interesting	.600
CE4	What I learn in the university is very important in getting a good job or career after completion of my studies	.597
CE12	I check my schoolwork for mistakes	.586
CE14	If I don't understand what I read, I go back and read it over again	.578
CE13	If I don't know what a word means when I am reading, I do something to figure it out, like look it up in the dictionary or ask someone	.556
CE6	My aim is to graduate from the university	.528
CE2	It is very important to get good CGPA	.501
CE1	I think education is very important	.498
CE11	I talk with people outside of school about what I am learning in class	.492
CE10	I study at home even when I don't have exam	.468
CE7	My next aim is to do Masters course	.444

Note. The alpha reliability = 0.842.

4.2 Confirmatory Factor Analysis of Single Constructs

After validating the instruments, basic model was proposed and examined with SEM techniques. The researchers examined the three student engagements separately for the entire population (N=790).

Table 8. Factor Loadings Extracted after CFA of the Four Constructs of Student Engagement

Factor	Indicator	Item	Factor Loading
Emotional Engagement	EE6	I like most of my Lecturers at the university	0.66
	EE8	Most of my lecturers care about how I'm doing	0.70
Emotional Engagement	EE11	Most of my lecturers understand me	0.76
	EE12	I feel excited by the academic work at the	0.72
	E13	university	0.71
	EE14	My lecture room is a fun place to be	0.66
		I feel I can go to my lecturers with the things that I need to talk about	
Behavioral Engagement	BE3	I always follow the university rules	0.58
Behavioral Engagement	BE5	I never skip classes	0.84
	BE6	I am never absent at the university without a	0.82
	BE14	genuine reasons	0.55
		I always obey University Dress Code	
Cognitive Engagement	CE1	I think education is very important	0.54
	CE2	It is very important to get good CGPA	0.63
	CE3	What I learn in the university is very important for	0.76
	CE4	my future life	
		What I learn in the university is very important in	0.79
	CE5	getting a good job or career after completion of my	0.57
	CE6	studies	0.57
		I am getting a good education at my university	
		My aim is to graduate from the University	

The CFA method was applied so as to ensure the maximum results to which the observed items generated by the underlying latent constructs provided the links between the latent variables and observed variables. Results of individual factor analysis of the USE Model are indicated in Table 8. In analyzing the single constructs, confirmatory measurement models of single constructs were specified prior to simultaneous estimation of the measurement model. In a process of exploring the most appropriate model, a theory-driven approach of model comparison strategy was applied, and competing models were generated on the basis of alternative formulations of the underlying theory (Hair et al.,

2010).

During the initial individual construct analysis (according to Byrne 2010), we found that each scale among the three scales of SEQ (2012), had some extremely problematic items and therefore removed. Sixteen out of forty four items have been retained as indicated in the Table 8. The overall fit indices of individual constructs and component fit measures were examined to check whether any construct would be rejected, but none was rejected. All the factor loadings were above 0.5 and all the three constructs were fit and accepted. The accepted constructs in terms of overall fit and component fit were then knitted together to form the measurement model of USE.

5. The Measurement Model of USE

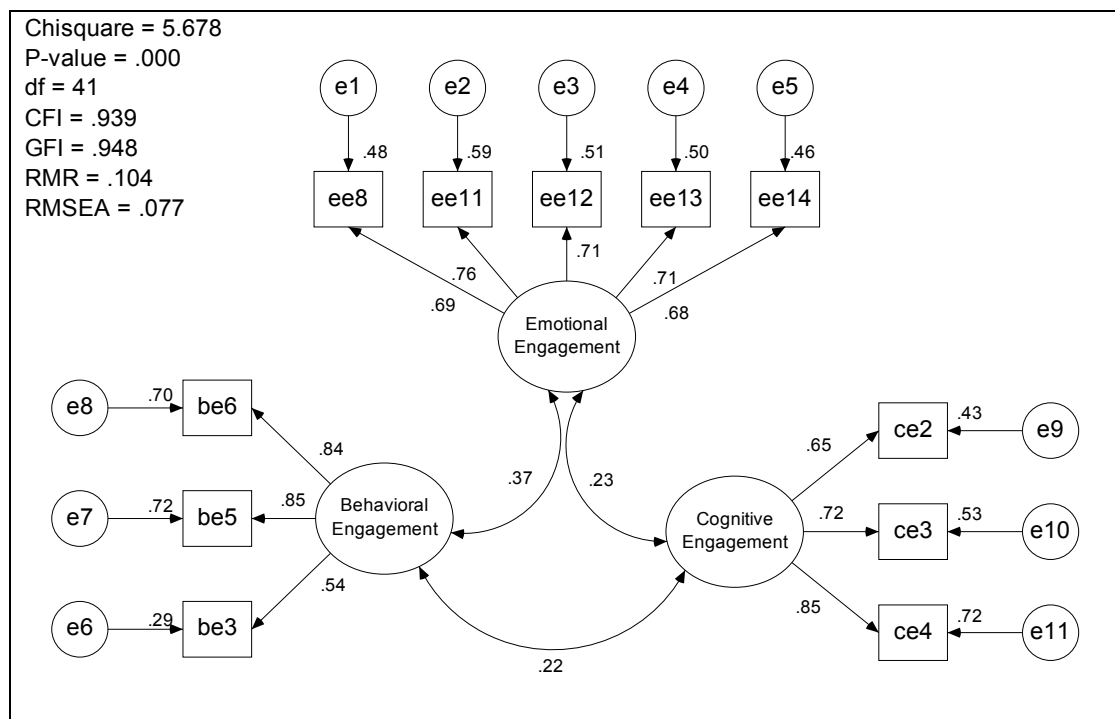


Figure 2. Hypothesized First Order Measurement Model of USE

5.1 CFA and Results of the Measurement Model of USE

The measurement model (Figure 2) is a first order confirmatory factor analysis model designed to test the multidimensionality of USE model, i.e., to test the hypothesis that the multidimensionality construct of USE is composed of inter-related constructs of emotional engagement, behaviour engagement and cognitive engagement. Offending estimates were searched for, however the measurement model indicated absence of negative error variances, i.e., absence of standardized coefficients exceeding 1.00, extreme values of standard errors and the residuals greater than 2.58. After a series of CFA, 11 items out of 13 items have been selected thus; the hypothesized model consists of the three inter-correlated factors with 11 observed variables (ee8, ee11, ee12, ee13, ee14, be3, be5, be6,

ce2, ce3, and ce4). Each observed variable was hypothesized to load onto one factor only. The researchers assessed the hypothesized model to determine to what extent the model fits the sample data. Almost all indicators were found to have good significant loadings with respect to model adequacy as a whole: the measurement of normed chi-square = 5.678, $df = 41$, CFI = 0.939, GFI = 0.948, RMR = 0.104, RMSEA = 0.077.

Feasibility of the individual parameters of the factor loading was estimated, results demonstrated in Figure 2, indicates a range of factor loadings from 0.54 (be3) to 0.85 (be5 and ce4). Thus, the requirement for convergent validity of ≥ 0.5 and not exceeding 1 has been fulfilled. The observed variables which measures a common underlying factor are all found to be statistically significant, i.e., Critical Ratio (CR) > 1.96 , while the Standard Error (SE) range from .061 to 0.151, the variances of error terms range from 0.329 to 1.435 and factor variances ranges from 0.469 to 1.022 are all within the significant range of ± 2.58 (Kline, 2011).

5.2 Descriptive Statistics of the Final Items of the Measurement Model of USE

The reliability statistics of the 15 items of the model of USE indicate a standard Cronbach's Alpha of 0.87. From a scale of 1-7 the mean is 5.28; the minimum and maximum scores range from 3.88 to 6.784; and the Standard deviation is from .591 to 1.96. The statistical values (z) of skewness fell below the threshold point of -3 to +3 (Kline 2011), and kurtosis fell below -10 and +10 thus, all are within the acceptable limits (Table 9), except for item CE11 with kurtosis of 14.63 which has been eliminated for further analysis.

Table 9. Distribution for the Short USE items (14) for the Whole Sample (N=790)

Variables	Mean	Std. Deviation	Skewness	Kurtosis
CE6 My aim is to graduate from the university	6.59	.862	-2.623	7.860
CE5 I am getting a good education at my university	6.13	.997	-1.281	2..08
CE4 What I learn in the university is very important in getting a good job or career after completion of my studies	6.27	1.08	-2.048	5.398
CE3 What I learn in the university is very important for my future life	6.41	.976	-2.112	5.374
CE2 It is very important to get good CGPA	6.39	1.04	-2.269	6.078
CE11 think education is very important	6.78	.591	-3.468	14.63
BE6 I am never absent at the university without a genuine reason	5.10	1.92	-.824	-.486
BE5 I never skip classes	4.51	1.96	-.482	-.954
BE3 I always follow the university rules	4.84	1.4	-.483	-.031

EE14	I feel I can go to my lecturers with the things that I need to talk about	4.27	1.59	-.276	-.558
EE13	My lecture room is a fun place to be	4.09	1.49	-.202	-.374
	I feel excited by the academic work at the university	4.46	1.41	-.191	-.249
EE1	Most of my lecturers understand me	3.88	1.47	-.076	-.470
EE8	Most of my lecturers care about how I'm doing	4.24	1.46	-.241	-.330
EE6	I like most of my Lecturers at the university	5.21	1.28	-.699	.585

5.3 Feasibility of the Individual Parameters of the Factor Loadings of USE

Through Maximum Likelihood Parameter Estimates, the feasibility of the individual parameters of the factor loading was estimated and the results are demonstrated in Table 10. Results indicates that the factor loadings ranged from 0.540 (*be3*) to 0.847 (*be5* and *ce4*). The observed variables which measures a common underlying factor were all found to be statistically significant, i.e., Critical Ratio (CR) >1.96, while the Standard Error (SE) range from .061 to 0.151, the variances of error terms range from 0.329 to 1.435 and factor variances ranges from 0.469 to 1.022 are all within the significant range of ± 2.58 (Kline, 2011).

Table 10. Maximum Likelihood Parameter Estimates: Feasibility of the Individual Parameters of the Factor Loadings of the Model of USE

Parameter	STD Factor Loading	STD Error (SE)	Critical Ratio (CR)	SMC	
Factor Loadings					
ee8	Most of my lecturers care about how I'm doing	0.692	-	-	0.479
ee11	Most of my lecturers understand me	0.765	0.061	18.219	0.585
ee12	I feel excited by the academic work at the university	0.711	0.058	17.199	0.505
ee13	My lecture room is a fun place to be	0.709	0.061	17.167	0.503
ee14	I feel I can go to my lecturers with the things that I need to talk about	0.679	0.065	16.546	0.461
be3	I always follow the university rules	0.540	-	-	0.292
be5	I never skip classes	0.847	.151	14.315	0.717
be6	I am never absent at the university without a genuine reason	0.838	.146	14.349	0.702

ce2	It is very important to get good CGPA	0.654	-	-	0.428
ce3	What I learn in the university is very important for my future life	0.725	.065	15.972	0.525
ce4	What I learn in the university is very important in getting a good job or career after completion of my studies	0.847	.085	15.798	0.718

Error Variances

				<i>P</i>	
1		1.112	.068	16.386	***
e 2		.897	.062	14.499	***
e 3		.982	.061	15.990	***
e 4		1.103	.069	16.026	***
e 5		1.369	.082	16.630	***
e 6		1.435	.078	18.310	***
e 7		1.091	.137	7.985	***
e 8		1.106	.131	8.452	***
e 9		.627	.039	15.915	***
e 10		.452	.034	13.438	***
e 11		.329	.044	7.427	***

Factor Variances

Behavior Engagement	.591	.078	7.565	***
Cognitive Engagement	.469	.051	9.196	***
Emotional Engagement	1.022	.099	10.283	***

Covariance

Emotional Engagement Behavioral Engage	.284	.040	7.129	***
Behavioral Engagement Cognitive Engage	.115	.025	4.666	***
Emotional Engagement Cognitive Engage	.162	.032	5.074	***

Correlations

Emotional Engagement Behavioral Engage	.366
Behavioral Engagement Cognitive Engage	.218
Emotional Engagement Cognitive Engage	.234

Note. All the hyphenated items were constrained to 1.00 and not tested for P-value. Three stars (***) indicates Significance P-value < 0.001 (two tailed).

The squared multiple correlation results (Table 10), shows that the factor of behavioral engagement is explained by 71.7% of the variance associated with *be5*, followed by 70.2% associated with *be6* and 29.2% associated with *be3*. Cognitive engagement factor is explained by 71.8% associated with *ce4*,

followed by 52.5% which is associated with *ce3*, followed by 42.8% associated with *ce2*. Emotional engagement construct is explained by 58.5% associated with *ee11*, followed by 50.5% associated with *ee12*, followed by 50.3.9% associated with *ee13*, followed by 47.9% associated with *ee8* and 46.1% associated with *ee14*. Results indicate that all the loadings are statistically significant good predictors (46.1% to 71.8%) except one predictor *be3* which is of average significance percentage of 29.2%.

In reference to Table 10, Maximum Likelihood Parameter Estimates results of Squared Multiple Correlation (SMC), shows the factor of **Behavioral Engagement** is explained by 71.7% variance of *be5*, followed by 70.2% variance of *be6*, and 29.2% associated with variance of *be3*. **Cognitive Engagement** factor is explained by 71.8% variance of *ce4*, followed by 52.5% variance of *ce3*, followed by 42.8% variance of *ce2*. **Emotional Engagement** construct is explained by 58.5% variance of *ee11*, followed by 50.5% variance of *ee12*, followed by 50.3% variance of *ee13*, followed by 47.9% variance of *ee8* and 46.1% variance of *ee14*.

These results indicate that almost all the loadings are statistically significant good predictors (46.1% to 71.7%) except one predictor *be3* which is of average significance percentage of 29.2%. The latent factor correlations are significant and positively correlated with $r = 0.366$ (*behavioral and emotional engagement*); $r = 0.218$ (*behavior and cognitive engagement*); $r = 0.234$ (*cognitive and emotional engagement*). The result of correlation among three latent factors of USE model indicated no correlation of above 0.85 and none below Critical Ratio of > 1.96 , i.e., none of the values is above 0.01 significance. This supports the discriminant validity upon which factors are independent and yet they are moderately correlated.

Convergent validity which is referred to a set of variables (items) that presume to measure a construct (Kline, 2005) and discriminant validity which refers to the extent in which a construct is truly distinct from other constructs (Byrne, 2010; Kline, 2011), was carried-out in the process of assessing the set of variables within the three factors which represents the student engagement scales (emotional, behavioral and cognitive engagement). Despite of having their significant loadings, the student engagement items vary significantly as to the degree to which they explain the factor. The factor loadings are all within and above their expected limits.

Average Variance Extracted (AVE) for each construct was compared against the square of correlation between the items within each factor and all AVEs are > 0.5 . According to Fornell and Lacker (1981), $AVE \geq 0.5$ indicates high convergent validity; and factor loadings ≥ 0.5 indicate high convergent validity, i.e., above 50% (Hair et al., 2010), thus, all our three constructs are considered to have a high convergent and discriminant validity and therefore all three factors have been retained. The values of the residual co-variances are all below the threshold point of Multicollinearity of < 2.58 (Hair et al., 2010) therefore, the model is accepted even without the re-specification of the Modification Indexes.

Table 11. Convergent and Discriminant Validity

Convergent Validity		Discriminant Validity	
Constructs	AVE	Correlation	r ²
EE Construct	0.51	EE BE	(0.37) ² = 0.13
BE Construct	0.57	EE CE	(0.23) ² = 0.05
CE Construct	0.56	BE CE	(0.22) ² = 0.04

5.4 CFA and Results of the Second Order Measurement Model of USE

By using the maximum likelihood procedure of the confirmatory factor analysis the validity of second order factor was tested after the first order factor of the model of USE. The hypothesis for second order measurement model of USE are: Responses to the Student Engagement can be explained by three first order-factors (emotional engagement, behavioural engagement and cognitive engagement); each item has a nonzero loading on the first-order factor it was designed to measure, and a zero loadings on the other two first-order factors; error terms associated with each item are uncorrelated; co-variation among the three first-order factors is explained fully by their regression on the second order factor.

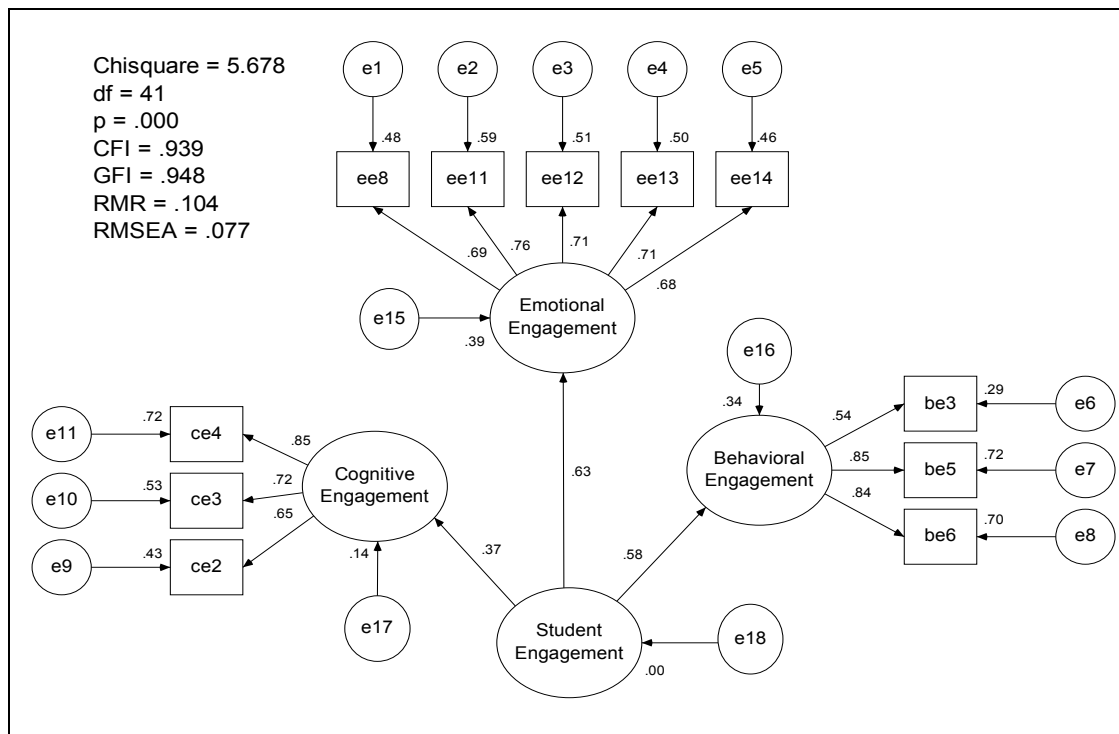


Figure 3. Hypothesized Second Order Factor of the Measurement Model of USE

The overall fit of the second order model of USE (Figure 3) is adequate as depicted in the model and as explained in the results of the first order measurement model whereby the measurement of normed chi-square = 5.678, *df* = 41, CFI = 0.939, GFI = 0.948, RMR = 0.104, RMSEA = 0.077. All factor

loadings define their respective factors, and the co-variation among the three first-order factors is explained fully by their regression on the second order factor.

Figure 3 depicts two of the first order factors which are measured by three items and the third factor is measured by five items and each item is loading on its own factor only. Results indicate that the hypothesized first and second order measurement models provide a good explanation of the model of USE in the current study. With its three inter-related factors (emotional engagement, behavior engagement and cognitive engagement) and eleven measured variables, this model supports the hypothesis that the measurement model of USE is a multidimensional construct consisting of emotional engagement, behavior engagement and cognitive engagement. The overall fit of the model is adequate as depicted in the model and as explained in the results of the first and second order measurement models. All factor loadings define their respective factors, and factor correlations are of moderate size while representing their distinct constructs. Therefore, this result affirms the two hypothesis of research question firstly, it affirms that each factor substantially influences its target indicators; each of which accounts for more than 50% of the variance explained and secondly, it affirms that the hypothesized measurement model of USE adequately fits the data. Moreover, it affirms the single hypotheses of research question two which claims for the occurrence of a significant inter-relationship between emotional, cognitive, and behavioural, engagement of undergraduate students.

In summary, the hypothesized measurement model (Figure 3) provides a good explanation of the model of USE in the current study. With its three inter-correlated factors (emotional engagement, behavior engagement and cognitive engagement) and eleven measured variables, this model supports the hypothesis that the measurement model of USE is a multidimensional construct consisting of emotional engagement, behavior engagement and cognitive engagement. Thus, the three constructs of emotional, behavioral and cognitive engagement, managed to fulfill the assumptions of construct validity, i.e., convergent validity (Factors loadings and variance extracted of ≥ 0.5) and discriminant validity (correlations among factors of less than 0.85 and very good reliability (Cronbach Alpha = 0.87). All the factor loadings define their respective factors, and factor correlations are of moderate size while representing their distinct constructs. Therefore this result affirms the hypothesis of this study firstly, each factor substantially influences its target indicators, each of which accounts for more than 50% of the variance explained and secondly, the hypothesized measurement model of USE adequately fits the data.

6. Discussion

This paper reports first part of the findings of the major study written by the Authors of this study, entitled “Predictors of Self Handicapping Behavior among Muslim Students”, therefore, the main goal of this study is to share the study which is on edge of methodological development. However, the aims for this part of the study are to assess construct validity of the student engagement questionnaire (SEQ, 2011) and to examine the factorial structure of the Measurement model of the University Student Engagement.

In summary, the hypothesized measurement model of USE provides a good explanation of the model of the current study. With its three inter-correlated factors (emotional engagement, behavior engagement and cognitive engagement) and eleven measured variables, this model supports the hypothesis that the measurement model of USE is a multidimensional construct consisting of emotional engagement, behavior engagement and cognitive engagement. Thus, the three constructs of emotional, behavioral and cognitive engagement, managed to fulfill the assumptions of construct validity, i.e., convergent validity (Factors loadings and variance extracted of ≥ 0.5) which also proves discriminant validity (AVE's are more than the sum of square correlation between the items within each factor). All the factor loadings define their respective factors, and factor correlations are of moderate size while representing their distinct constructs. Reliability is also very good with the Cronbach Alpha = 0.87. Therefore, this result affirms the hypothesis of this study firstly, each factor substantially influences its target indicators, each of which accounts for more than 50% of the variance explained and secondly, the hypothesized measurement model of USE adequately fits the data.

Findings of the present study have expanded the existing body of knowledge on the reciprocal interaction theory of emotion, behavior and cognition. Firstly, it substantiated the psychometric adequacy of the measure of university student engagement model, the measures seems to be sufficient to represent the measurement tools of assessing student engagement. Secondly, it validated the good fit of the measurement model of USE. Fourthly, it supported the efficacy of the original model of reciprocal interaction of emotion, behavior and cognition of (Elis, 1955) which posits that cognitions, emotions, and behaviors interact significantly and have a reciprocal cause and effect relationship. In addition the results are congruent with the results of (Ellis, 2001a, 2001b, 2002, 2011; Ellis & Dryden, 2007; Wolfe, 2007) which also found the significant relationship of emotion, cognition and behavior.

7. Conclusion

The strength of this study is the ability to examine the hypothesized USE model and to validate the results through structure equation modeling for the three instruments that are measuring emotional engagement, behavioral engagement and cognitive engagement of undergraduate students. Adequate fit indices for the USE model is indicated within the model. All items are reliable with standardized loadings ≥ 0.5 . Thus all three tools are considered valid and can be used by School counselors in studying the students' behavior.

In conclusion, finding of this study proves Albert Elis's theory of reciprocal interaction between emotion, behavior and cognition. The SEQ (2011) provides means by which researchers can investigate students' engagement towards emotion, behavior, and cognition. Hence, it has proved its usefulness in predicting students' engagement or disengagement as well as self-handicapping behavior which is detrimental to successful achievement. Therefore, the next plan of the authors of this study is to proceed with the study of predictors of self-handicapping behavior by utilizing the present SEQ (2011) and correlate with the self-handicapping behavior scale. We take the advantage of latest analytical

approaches and new computer software development which allows us to apply new methods of analysis thus, contribute to the solutions of educational, psychological and counseling issues as well as improved analysis. Hence, the results of this study will not only contribute to the literature and researches done on student engagement, but might also allow the introduction of valid instrument that can be used by School Counselors and counseling undergraduate students in identifying and rectifying issues on student disengagement especially from Islamic universities.

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Appendix A

Student’s Engagement Questionnaire (2011)

Today’s Date: _____ Student No: _____ Age: _____

Nationality: _____ CGPA (Last Halaqah): _____ Male () Female ()

We are interested in studying the relationship between the university students’ engagement and their academic self-handicapping behaviors. Please try to rate each Engagement as independently of the others as you can. Please write a number in the blank of each item, indicating the degree to which you agree with each of the following statements as a description of how much you are engaged to the university.

1	2	3	4	5	6	7
Disagree						Agree
Very Much						Very Much

Emotional Engagement	
1	When I first walked into my university I thought it was Good
2	When I first walked into my university I thought it was Friendly

3	When I first walked into my university I thought it was Clean	
4	I am happy to be at my university	
5	The Lecturers at my university treat students fairly.	
6	I like most of my Lecturers at the university.	
7	The discipline at my university is fair.	
8	Most of my lecturers care about how I'm doing.	
9	Most of my lecturers know the subject matter well.	
10	There is an adult at University that I can talk to, about my problems.	
11	Most of my lecturers understand me.	
12	I feel excited by the academic work at the university.	
13	My lecture room is a fun place to be.	
14	I feel I can go to my lecturers with the things that I need to talk about.	
<i>Behavioral Engagement</i>		
1	I never thought of dropping out of the university	
2	I work very hard when I am in the lecture room	
3	I always follow the university rules	
4	I never get in trouble at the university	
5	I never skip classes	
6	I am never absent at the university without a genuine reason	
7	I stay at home after the lecture hours	
8	I enjoy the work I do in class	
9	I respect most of my lecturers.	
10	I regard all my colleagues equally no matter which country they came from	
11	I always avoid gossiping	
12	I try to avoid arguments	
13	I hate to see two people fighting	
14	I always obey university dress code	
<i>Cognitive Engagement</i>		
1	I think education is very important	
2	It is very important to get good CGPA	
3	What I learn in the university is very important for my future life	
4	What I learn in the university is very important in getting a good job or career after completion of my studies	
5	I am getting a good education at my university	
6	My aim is to graduate from the university	

7	My next aim is to do Masters course	
8	Most of my courses are very interesting	
9	When I read a book, I ask myself questions to make sure I understand what it is about.	
10	I study at home even when I don't have exam.	
11	I talk with people outside the campus about what I am learning in class	
12	I check my schoolwork for mistakes	
13	If I don't know what a word means when I am reading, I do something to figure it out, like look it up in the dictionary or ask someone.	
14	If I don't understand what I read, I go back and read it over again.	
15	I try my best at the university.	
16	I get good grades at the university.	