PSYCHOMETRIC ANALYSIS OF SELF-EFFICACY ENCOURAGEMENT IN THE UNIVERSITY ENVIRONMENT: A MALAY VERSION

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Abstract: This study introduced the Self-efficacy Encouragement Questionnaire (SEEQ). The researcher developed the instrument to investigate whether or not the university lecturers encourage undergraduate students to develop their academic self-efficacy through learning interactions. The researcher applied the Principal Component Analysis (PCA) and Confirmatory Factor Analysis (CFA) to test the cross language equivalence of the SEEQ and to explore whether its psychometric properties are universally sound and therefore it can be used by Malay speaking researchers. Additionally, frequency analysis was used to test proportion of the lecturers' self-efficacy encouragement. The researcher distributed the Malay version of the SEEQ to 232 Malaysian undergraduate students who are currently studying at Sultan Idris Education University - Malaysia. The PCA was used to answer the research question 1: What are the psychometric properties of the Self-efficacy Encouragement Questionnaire? The CFA was applied to answer research question 2: What is the hypothesized model fit of the self-efficacy encouragement? The results show satisfactory validity and reliability for the SEEQ. The research model fits were statistically acceptable and therefore, it's justified to be adopted in other related studies. Further, the frequency analysis test indicated that the proportion of lecturers' self-efficacy encouragement in the university is encouraging. The combination of the present results suggested that the university lecturers play an important role to build students' self- efficacy, therefore, they are crucial pillar and a source of students' self-efficacy development.

Keywords: psychometric analysis, self-efficacy encouragement, Malay version, and undergraduate students.

Literature review

There are several factors that influenced individuals to develop self-efficacy beliefs. They are enactive attainment, actual experience, verbal persuasion, social evaluation and Comparison (Bandra 1986, 1994; Schunk et al. 1987). Children interaction and environment increased self-efficacy (Bandura 1997; Meece 1997; Jonson-Reid et al 2005). Social word of encouragement and modeling contributed to the self - efficacy development (Pandora 1986; Schunk, 1987; Schunk and Hanson 1988). Further, Bandura (1986, 1997) emphasized that human action towards success depends on how deep the interactions between one's personal thoughts and demands while Bandura (1994) argues that low self-efficacy is associated with helplessness feeling which leads to human failure. It was empirically shown that Collective Cognitive and teachers' self-efficacy influenced students' academic achievement (Bandura 1993; Collins 1982; Hoy and Murphy 2003; Pajares 1992; Ashton & Webb, 1986; Ashton 1985). Additionally, a sense of self- efficacy motivates students to believe in their own ability to successfully exercise learning activities. When students are confident in themselves, they think of learning difficulties as challenges (Pandora 1986; Bandura and Lock 2003; Schunk 1982).

Research method

The researcher developed the SEEQ to examine university lecturers' involvement in the process of self-efficacy development among university students through learning interactions and to what extent they were encouraged. Initially, the SEEQ comprises 14 items and were rated on a 7-point Likert scale ranging from 1 (not very true) to 7 (very true). A translated SEEQ English version of Malay language was distributed to 232 Malaysian undergraduate students who are studying at Sultan Idris Education University - Malaysia. The SEEQ - Malay version was distributed after a considerable content validity by some experts in educational research. The Principal Component Analysis (PCA) and Confirmatory Factor Analysis (CFA) were applied to answer the research questions. The PCA was used to answer research question 1: What are the psychometric properties of the Self-efficacy Encouragement Questionnaire? The CFA was applied to answer research question 2: What is the hypothesized model fit of the self-efficacy encouragement? The findings are stated below. Additionally, the researcher used frequency analysis to test the proportion of lecturers' self-efficacy encouragement in the university.

Results of the self-efficacy encouragement

A Principal Component Analysis with varimax rotation was conducted repeatedly on items of the SEEQ before obtaining satisfactory results. For example, the first analysis result indicates that some items were cross-loaded on different components. When the researcher removed these items, the complexity of items was resolved (no item complexity). However, the researcher continued the analysis exercises until the satisfactory results were obtained for 8 Items and the remain 6 items (6,7,8,9,10,13)   were finally deleted. According to table 1.1, KMO and Bartlett's Test overall results show the model fit of the SEEQ data. Besides, the Kaiser- Meyer-Olkin Measure of Sampling Adequacy (MSA) shows a value of .890 which is greater than the above minimum requirement (.50). Simply, the overall (MSA) result shows a strong and adequate correlation among items. Further, Bartlett's Test (BTS) shows that the analysis result is statistically significant P ≤ .001. Due to satisfactory results of MSA and BTS, the researcher proceeds with the research.

Table 1.1 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.890
Bartlett's Test of Sphericity	Approx. Chi-Square	871.197
	df	28
	Sig.	.000

According to table 1.2, the Anti-image Correlation values are greater than 0.8. This is an additional indication to prove the existence of a strong inter-correlation between the items which are greater than the acceptable level (. 5) for each individual variable (table 1.2).

Table 1.2 Anti-image Correlation loading

	Item no							
	1	2	3	4	5	11	12	14
Item 1	.879a							
Item 2		.895a						
Item 3			.894a					
Item 4				.917a				
Item 5					.917a			
Item 11						.883a		
Item 12							.851a	
Item 14								.884a

a Measures of Sampling Adequacy(MSA)

The Communality values are summarized in table 1.3. The table indicated that there were no items below requirement (.5) excluding item 14. However, the researcher decided to retain the item due to other statistical goodness.

Table 1.3 commonalities result

	Initial	Extraction
ENCO1	1.000	.595
ENCO2	1.000	.512
ENCO3	1.000	.593
ENCO4	1.000	.543
ENCO5	1.000	.652
ENCO11	1.000	.562
ENCO12	1.000	.599
ENCO14	1.000	.462

Extraction Method: Principal Component Analysis.

The Initial Eigenvalues and component Matrix results grouped the 8 items into one factor namely encouragement factor. The total variance explained, was 56.4% and the remaining 30% could not explain in this study. The analysis also shows factor loading of 4.51 which was higher than the requirement of at least 1 indicating that the method of a principal components analysis and varimax rotation yielded only one meaningful factor solutions with satisfactory psychometric characteristics (Hair & Black 1998). Further, Chronbach's alpha demonstrates a strong statistical internal consistency between remaining 8 items (.889).

Confirmatory Factor Analysis Result

Since an inspection of the PCA results revealed a possible reason for the multicollinearity and loading miss-fit among six items, the items were not incorporated into the CFA. Also, a confirmatory factor analysis was conducted on the hypothesized one-factor- model using the AMOS version 16 (Arbuckle, 2005) model-fitting program. The program adopted maximum likelihood estimation to generate estimates in the measurement model. To assess the fit of the 8-item measurement model, the analysis relied on a number of descriptive fit indices, which included the (1) minimum value of the discrepancy between the observed data and the hypothesized model divided by the degrees of freedom (CMIN/df), (2) Comparative Fit Indices (CFI) and root mean square error of approximation (RMSEA). Barbara and Bryne (2010) point out that first, the CMIN/df with a value of between 2 and 5 is considered acceptable. Second the appropriate values for CFI ranges from 1- 0.9. Finally, a value of RMSEA of .08 or less shows a reasonable error of estimation Barbara and Bryne (2010).

Hypothesized Model

Figure 1 presents the estimated one factor model and items in the scale are assumed to load only on the latent variables. The hypothesized model (ENCO1-ENCO8) represents observed variables (items) ; el-e8 represents error variances; double headed arrows give a picture of correlations among items; single headed arrows from factors describe factor loadings). In addition, the results showed that the parameters were free from offending estimates, the values of the factor loadings were greater than [2.0.] which is above critical ratio cut-score of 1.96, this proves the evidence of statistical significance of indicators.

Figure 1 Hypothesized Model
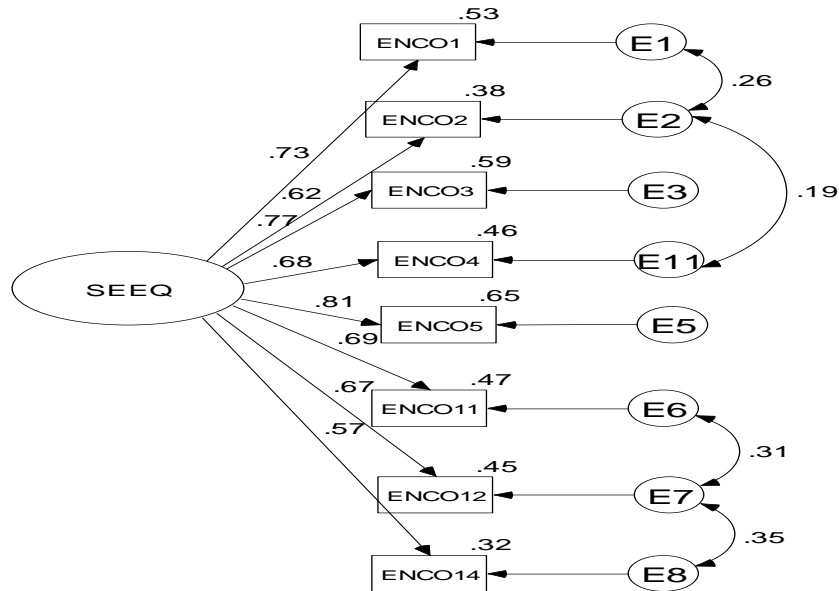
Model Fit

The overall fit of the 8-item measurement model is summarized in Figure above. The goodness-of-fit results indicate that the model fits the data: in the sense that the hypothesized model adequately described the sample data that is, the measurement model did generate almost 99% the Comparative Fit Index. The route and degree of the factor loadings were considerably and statistically significant all greater than 1.96. The overall fit indicators and parameter values are summarized in the table 1.3.

Table 1.4 Acceptability of Model Fit Indices

χ^2	25.205	RMR	.026
CFI	.989	RMSEA	.050
GFI	.974	HOELTER .05	241
TLI	.981	HOELTER .01	294
AGFI	.942		

Frequency Analysis Result

The frequency analysis results indicate that the respective university lecturers encouraged degree students to develop their self-efficacy during learning activities. Also, the frequency analysis shows that the Self-efficacy Encouragement Questionnaire (SEEQ) perfectly describe the academic sense efficacy of respondents. For illustration, table 1.5 shows the distribution of the respondents to items of the SEEQ, the majority of participants 49.6% show that item eleven "My lecturers emphasis that it is when I believe in myself, I can make my specific course goals achievable" truly picture their lecturers' self-efficacy encouragement while the majority of participants) 48.3%) demonstrated that item two "My lecturers make me confident that I have ability to execute all my university assignments" was also portray received self-efficacy in the university. At the same time, 44 % of the

participants indicated that item three "My lecturers inform me that my self-efficacy will help me to obtain better academic achievement" was truly described their initiated learning believe. 44.0% of respondents demonstrated that item one "My lecturers encouraged me to be confident in myself and beat the odds of my university courses" and item five (40.1%) "My lecturers inform me about their self-confidence and how it helps them to overcome lots of learning difficulties" were truly explained the kind of received self-efficacy encouragement in the university.

Table 1.5 Frequency analyses

No of item	Sort of true	true	Very true
1	21.1%	44.0%	27.2%
2	29.7%	48.3%	15.1%
3	25.4%	44.0%	23.3%
4	31.0%	41.4%	15.9%
5	28.9%	40.1%	15.5%
11	22.8%	49.6%	18.1%
12	32.3%	42.2%	13.8%
14	26.3%	45.7%	15.1%

Notice: 1 = sort of true of me 2 = true of me 3 = very true of me.

Discussion Conclusion

The combination of the above results suggested that the university lecturers play an important role to build students' self- efficacy, therefore, they are practical and scientifically crucial source of students' self-efficacy development. Though, the level of involvement in self-efficacy development process May perhaps different, based on organization and individual characteristics which naturally suggest further intensive academic investigations. Bandura (1986; 1994) argues that word of encouragement initiates self-efficacy development, while low Self-efficacy found to be associated with helplessness feeling. Loo & Choy 2013 showed that self-efficacy sources of engineering diplomas were correlated with mathematics achievement scores, suggesting reviewing of engineering curriculum and instructional design to improve students' performance in the field. Christensen (2008) shows a decline in the self-efficacy of most successful law students who participated in the study. However, the research emphasized that the successful law students love learning, they use effort, and they consider learning challenges as something necessary to face. When students are encouraged to be confident in themselves they consider learning difficulties as challenges (Bandura 1986 ; Bandura and Lock 2003; Schunk 1982). Finally, the present findings supported the three previous SEEQ's results; they are English version, Arabic version, and Chinese version (Muhammed Yusuf 2008; 2010; 2013). The PCA and CFA results of the SEEQ Malay Version were statistically sound and for that reason, it could be used in any other similar studies.

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PSYCHOMETRIC ANALYSIS OF SEL -EFFICACY ENCOURAGEMENT (SEEQ) MALAY VERSION

Soal selidik berikut mengenai tahap akademik anda termasuk tahap ~~dorongan~~ bimbingan pensyarah untuk meningkatkan prestasi akademik anda. Jawapan anda akan dirahsiakan Oleh itu, anda tidak dibenarkan menulis nama anda atau sebarang pengenalan diri anda. Jawapan bagi soalan ini tidak ada betul atau salah. Oleh itu anda hanya menjawab setepat mungkin. Gunakan kedudukan skala di bawah ini untuk menjawab soalan. Jika anda fikir kenyataan itu amat benar tentang anda, tandakan 7, jika kenyataan sama sekali tidak benar tentang anda, tandakan 1. Jika kenyataan yang lebih atau kurang benar tentang anda maka cari nombor antara 1 dan 7 yang paling sesuai dengan anda.

1. not at all true of me   : Sama sekali tidak benar
2. not very true of me   : Sangat tidak benar
3. not true of me   : Tidak benar

4. not sure : Tidak yakin
5. sort of true of me : Agak benar
6. true of me : Benar
7. very true of me : Amat benar

S/N	ITEMS	1	2	3	4	5	6	7
1	Pensyarah saya menggalakkan saya untuk berkeyakinan serta percaya terhadap diri sendiri dan boleh mengatasi cabaran kursus-kursus di universiti My lecturers encouraged me to be confident in myself and beat the odds of my university courses.							
2	Pensyarah saya membuat saya yakin bahawa s aya mempunyai keupayaan untuk menjalankan semua tugasan saya di universiti. My lecturers make me confident that I have the ability to execute all my university assignments.							
3	Pensyarah memberitahu saya bahawa efikasi dorongan diri akan membantu saya untuk mendapatkan pencapaian akademik yang lebih baik. My lecturers inform me that my self-efficacy will help me to obtain better academic achievement							
4	Pensyarah saya menjelaskan kepada saya bahawa efikasi dorongan diri membuat saya bertahan dalam suasana universiti My lecturers make it clear to me that my self-efficacy will make me survive in the university setting.							
5	Pensyarah saya memberitahu saya tentang keyakinan diri mereka dan bagaimana ini membantu mereka untuk mengatasi masalah pembelajaran My lecturers inform me about their self-confidence and how it helps them to overcome lots of learning difficulties.							
6	Pensyarah saya menekankan bahawa jika kita mempunyai keyakinan dalam diri kita boleh mencapai matlamat khusus bagi kursus yang diambil My lecturers' emphasis that it is when I believe in myself, I can make my specific course goals achievable.							
7	Pensyarah saya menekankan bahawa kepercayaan diri saya boleh membantu saya melaksana perancangan kerja kursus di universiti. My lecturers stress that my confidence can help my university course plan works.							
8	Saya galakkan oleh pensyarah untuk berasa yakin dalam merancang rancangan pembelajaran berkesan pembelajaran bagi kursus di universiti							

	I feel encouraged by my lectures to feel confident in designing effective study plans for my university courses.							