ASM Sc. J., 14, Special Issue 1, 2021 for ICSTSS2018, 40-47

Confirmatory Factor Analysis of Career Decision among Malaysian Undergraduates in Raub, Pahang

Suriyati Ujang[1*] and Fairuz Shohaimay[1]

[1]*Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Pahang, Raub Campus, 27600 Raub, Pahang, Malaysia*

According to Bank Negara Malaysia's annual report (2017), the graduate unemployment rate has increased since 2011, showing a rise of 4.1% in 2016. This study aims to investigate the potential functionality of the Career Decision Self-Efficacy Scales-Short Form (CDSES-SF) in better understanding the career behaviour of undergraduate students in Malaysia. Data collected from 333 students from a public university in Malaysia were analysed using confirmatory factor analysis (CFA), assisted with AMOS 25 software. The Cronbach's alpha value for all five-factors in CDSES-SF is above 0.833, which signifies relatively high internal consistency. A five-factor first-order model consisting of 25 items was developed to cover latent factors labelled as Goal, Planning, Problem Solving, Self-Appraisal and Occupational Information. The model represents an acceptable fit based value of the chi-square divided by degree of freedom (χ^2/df), comparative fit index, and Root Mean Square Error of Approximation. The results demonstrate that a positive correlation exists among the four factors, except for the factor "Goal". Although Malaysian undergraduates might possess all four factors, this does not necessarily imply that they are goal-oriented, which may potentially contribute to lower adaptation in the job-hunting field. As a recommendation, future research is needed to further explore the career decision-making based on job seeking and job applications among diverse cultures and people of various age groups.

Keywords: career decision; CDSES-SF; confirmatory factor analysis; self-efficacy; undergraduates

I. INTRODUCTION

The Key Statistics of Labour Force in Malaysia (2018) reports that the unemployment rate in the country is 3.3%. However, the unemployment rate among Malaysian youth is over three times higher, which was estimated to be 10.7% in 2015 (Mohd Ibrahim & Mahyuddin, 2016). Furthermore, the graduate unemployment rate in Malaysia experienced a steep increase since 2011, with the latest figure was recorded to be at 4.1% in 2016 (Ang *et al*., 2018). Unemployment among graduates continues to be of significant concern in the country, as with other countries. Numerous studies were conducted to determine the possible factors and indicators, with the aim of improving the employability of future graduates.

Evidence derived from the existing literature suggests that most of the related studies in Malaysia revolve around factors with respect to the quality of graduates. Hanapi *et al.* (2014) presented several factors to the unemployment problem, including graduates' attributes, lecturers' competency and quality of education. Annie and Hamali (2006) raised some issues in graduate employability, including the mismatch of graduates' skills with the needs of the industry, the appropriateness of graduates' employment, and low job openings in the public sector. Other studies suggested that there should be a revamp of the current curriculum in the higher education sector, in order to equip future graduates with the necessary skills to

*Corresponding author's e-mail: suriyatiujang@uitm.edu.my

satisfy the expectations of employers (Cheong *et. al.*, 2016; Ting *et al.*, 2017).

Although numerous proposals and suggestions to improve the quality of higher education have been brought forward, more attention should be directed in facilitating undergraduates in their career development. It is the norm to assume that students will decide their career paths once they enter University. However, career indecision and anxiety are likely to be problems for the majority of students. Lam and Santos (2018) argue that students were given little assistance in career decision making, thus resulting in career indecision. They further debated that the Malaysian higher education system overlooked the importance of career development among students.

Self-efficacy is among the pivotal factors to the employability of an individual. Armum and Chellappan (2016) assessed emotional and social self-efficacy among children and adolescents in Malaysia. Their findings indicate a significant difference in emotional self-efficacy across their academic abilities. Fook *et al.* (2015) claim that active learning and collaboration contribute significantly towards self-efficacy development among Malaysian undergraduates. Hence, further investigation is required to determine the factors of self-efficacy among the young generation in Malaysia.

Bandura (1986) proposed the self-efficacy theory as an indicator of a person's capability to apply the skills that they have to perform a particular job. Higher self-efficacy indicates better decision making in career planning, while low self-efficacy may lead to career indecision (Betz & Luzzo, 1996). Taylor and Betz (1983) introduced the Career Decision Self-Efficacy Scale (CDSES) to measure a person's beliefs in their capabilities to complete a task related to his or her career. The CDSES has been used in many studies to understand better career behaviour among youth and high school students in many countries, but receives little attention in Malaysia and South East Asia (Lam & Santos, 2018). Thus, it is worthy to understand the career behaviour and career development process that exist among youth and undergraduates in Malaysia.

Therefore, the primary objective of this study is to explore the potential utility of the Career Decision Self-Efficacy Scales-Short Form (CDSES-SF) in understanding the career behaviour of undergraduate students in Malaysia by using the five-factor model. CDSES consists of 50 items that provide subscale scores of assessing the degree of confidence towards student ability to complete career-related tasks, as outlined by Crites's (1978) Career Maturity Inventory for five main items: (a) accurate self-appraisal, (b) searching for occupational information, (c) goal selection, (d) making career plans, and (e) problem solving. The CDSES-SF is a compact version of CDSES, consisting of 25 items, and is sufficient to be used in this study on career behaviour.

II. METHODOLOGY

A. Participants

The participants involve 333 undergraduate students enrolled in five different programs at a public university in Malaysia. Participants are currently taking Diploma in Statistics (16%), Diploma in Computer Science (18.3%), Diploma in Public Administration Management (33.4%), Diploma in Business Management (16%) and Diploma in Banking (16.3%). A total of 272 (81.7%) were female, and 61 (18.3%) were male. Their age ranges from 17 to 22 years. Research participation was voluntary and was randomly selected using a stratified sampling technique. Students did not obtain any credit for their participation in this study. The participants were asked whether they have career planning, and 88.6% said yes. About 20% of the male participants does not have career planning, compared to only 10% of female participants. Approximately 68.5% of the participants agreed that their parents had much influence on their education and career choices.

B. Instrument

The data collection tool contains two parts. The first part involves questions related to demographic characteristics of the respondents (i.e. age, gender, program, and whether their family was involved in their career decision making). The second part consists of questions from CDSES-SF, which was adopted from Gauldron (2011), Taylor and Betz (1983), and Presti *et al.* (2013). However, slight modifications were made to ensure the suitability of the current version. For example, regarding occupational

information, instead of "going to the library searching for information", the term was changed to "searching using the internet". The CDSES was designed to assess an individual's level of belief of whether they can complete the required tasks in making career decisions. Accordingly, a short version of the 25-item form was developed (Betz *et al*., 1996).

Therefore, the CDSES-SF developed for this study consists of five-item subscales, amounting to a total of 25 items. The items' contents include behaviours relatable to self-appraisal, effort in searching about occupational information, having goal selection for future planning, and problem-solving. The self-efficacy outlook with respect to the career decision-making tasks was measured by asking the participant to rate their ability to finish each task positively. Participants rated themselves on a 5-point Likert scale from 1 to 5, where 1 represents "no confidence", and 5 represents "complete confidence". The scores obtained indicate that the higher the value, the greater the level of career decision self-efficacy. The internal consistency was checked using Cronbach's alpha for the CDSES-SF, where the value for the total scale is 0.932. Meanwhile, the value of the five subscales ranges from 0.833 to 0.944. Further analysis by confirmatory factor analysis using AMOS was used to explore the potential utility of the Career Decision Self-Efficacy Scales-Short Form (CDSES-SF) in understanding the career behaviour of undergraduate students in Malaysia, using the five-factor model.

III. RESULTS AND DISCUSSION

Before confirmatory analysis, the data set was scrutinised on the missing data, normality, sampling size, outliers, and multicollinearity (Tabachnick & Fidell, 2007). No missing data was found, and the sampling size assumptions were also met at 10:1, according to Kline (2005). The kurtosis and skewness were also adequate to conclude that the data were normally distributed. Values in the correlation matrix were checked for multicollinearity problems. Further analyses of the Variance Inflation Factor (VIF), Tolerance (T) and Conditional Index (CI) values were examined. The VIF were all lower than 10, while the T values were different from 0, and CI was less than 30 which, meaning that there is no problem with multicollinearity (Hair *et al*., 2010).

The first assessment on the model unidimensionality was done to check whether the measuring items have acceptable factor loadings. According to Awang (2012), the minimum factor loading should be more than 0.6 for an established scale. All standardised factor loadings are above 0.641, as in Table 1. Hence, unidimensionality is achieved. Three types of validity were checked in this study, namely, convergent validity, construct validity and discriminant validity. Based on Table 1, the value of Average Variance Extracted (AVE) for every construct achieves convergent validity when the AVE values are all greater than 0.5. The fitness indices, as reported in Figure 1, show that the Root Mean Square Error of Approximation (RMSEA) is 0.050, and the ratio of χ^2/df is 1.8417, signifying that construct validity is attained. The discriminant analysis was also satisfied, as the Modification Indices were less than 15 (Awang, 2012).

Table 1. The confirmatory factor analysis report summary for all constructs

Construct/Item	SL	CR	α	AVE
Goal Selection		0.945	0.944	0.711
G1: I am very clear about what my goals are for the next seven years	.834			
G2: I am very clear about how my diploma fits into my life plans	.844			
G3: I am confident that I have planned sufficiently to enable me to achieve my goals	.897			
G4: I am very clear about the importance of reflective activity to professional life	.860			
G5 I know how to stick to my aims and accomplish my goals	.847			
G6: I have selected one major from a list I was considering	.866			
G7: I have selected one occupation from a list of potential occupations	.748			

Construct/Item	SL	CR	α	AVE
Career Planning		0.907	0.906	0.662
Planning1: Determine the steps I need to successfully complete my chosen major	.783			
Planning2: Make a plan of my goals for the next 5 years	.867			
Planning3: I think I can successfully manage the job interview process	.773			
Planning4: Identify the relevant employers for my career possibilities	.852			
Planning5: Preparing and improving my resume	.787			
Problem Solving		0.889	0.833	0.672
PSolving1: Persistently work for my major or career goal even when I get frustrated	.882			
PSolving2: Determine steps to take if I am having academic trouble with my major	.885			
PSolving3 Identify some major or career alternatives if I am unable to get my first choice	.847			
PSolving4: Change occupations if I am not satisfied with the one I enter	.641			
Self-Appraisal		0.924	0.923	0.709
Self_app1: Figure out what I am ready or not to sacrifice for my career goals	.805			
Self_app2: Accurately assess my abilities	.850			
Self_app3: Determine the kind of lifestyle I would like to live	.873			
Self_app4: Determine what my ideal job would be	.869			
Self_app5: Decide what I value most in an occupation	.811			
Occupational Information		0.912	0.911	0.721
Occupational_info1: Use the Internet to find information about occupations that interest me	.855			
Occupational_info2: Find the average yearly earnings of people in an occupation	.861			
Occupational_info3: Find out the employment trends for occupation over the next 10 years	.794			
Occupational_info4: Find information about graduate or professional schools	.883			

Note: SL = Standardized loading; CR = Composite reliability; AVE = average variance extracted; α = Cronbach's alpha. The 25 items were adapted from Betz *et al.* (1996), Gauldron (2011) and Presti *et al.* (2013)

According to Gaudron (2011), the confirmatory factor analysis was performed on one measurement model combining all latent constructs. Since all factor loadings were above 0.6, no items were deleted. All internal reliability, construct reliability, and the value of average variance extracted exceeds the minimum requirements, at 0.7, 0.6 and 0.5, respectively.

Table 2 shows the means and standard deviation for the five original subscales and the total 25-items. The mean scores for each construct represent the average response overall 25 items of the total scale. The mean for the subscales is obtained by dividing the sum of the response scores by the number of items in each subscale (Betz *et al.*, 2005). Based on Table 2, the subscales for total sample has the mean ranging from 3.39 to 3.57 for all constructs (self-appraisal, occupational information, career planning and problem solving) except career goal. The mean scores for career goal are only 2.4736, which indicates only a fair amount of confidence reflected by the respondents for the goal selection. Based on the mean scores, an average score of the level of confidence for the male participants is lower than the female participants in all constructs measured in this study.

Table 2. Means and standard deviations (SD) of CDSES-SF scores

CDSES – SF	Total sample (N =333)		Female (n =272)		Male (n = 61)	
	Mean	SD	Mean	SD	Mean	SD
Goal selection	2.4736	0.8139	2.4779	0.8090	2.4543	0.8421
Career planning	3.3952	0.7552	3.4551	0.7140	3.1279	0.8741
Problem solving	3.4700	0.7976	3.5257	0.7724	3.2213	0.8649
Self-appraisal	3.5045	0.7790	3.5426	0.7643	3.3344	0.8268
Occupation information	3.5721	0.8540	3.6204	0.8178	3.3566	0.9784

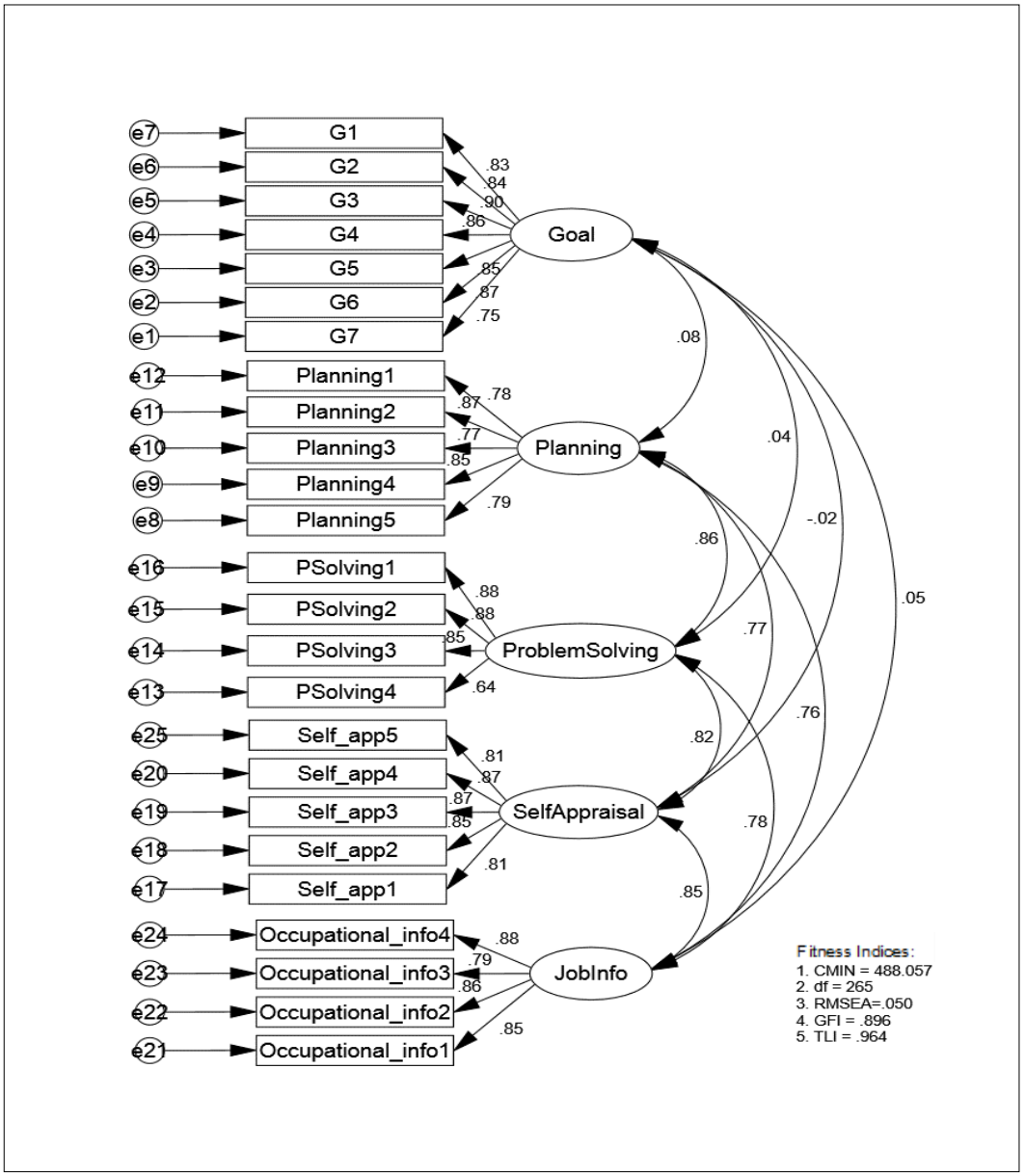

Figure 1. Path diagram for confirmatory factor analysis

The solution model was tested using confirmatory factor analysis on 333 valid cases. The confirmatory factor analysis was performed to test the assumptions that there were five correlated factors and the observed variables. All factor loadings are as indicated in Figure 1. The first of each set of regression paths linked to the factors was fixed at 1.0. The observed variables errors of measurement were uncorrelated. A five-factor measurement model (Figure 1) was generated using AMOS 25. The maximum likelihood estimation was employed. The maximum likelihood

estimates ranged from a low 0.64 on the problem-solving subscale to a high of 0.897 on the goal selection subscale.

Results in Table 3 shows a summary of overall model fit measures. All absolute measures were significant and considered acceptable except for the χ^2 test result. The results show the model fit where the χ^2 value (488.057) together with the degree of freedom (265) and the p-value (0.000). Kelloway (1998) and Jin *et al.* (2012) also mentioned that, although the data fit the model well, it is difficult to accept the null hypothesis from the χ^2 test results with a large sample size. Bentler and Bonnet (1980) suggested that, since χ^2 is sensitive to sample sizes, the chi-square divided by degree of freedom is a better-fit metric. The χ^2/df for this study is 1.842. Since it is lower than five, the current confirmatory factor analysis is an acceptable model fit. According to Awang (2012) and Holmes-Smith *et al.* (2006), it is recommended to test at least three fit indices, namely, the absolute fit, incremental fit and parsimonious fit. The RMSEA, CFI or TLI and χ^2/df are used as the fitness index for each category, respectively.

Table 3. Comparison of the fitness indices and the recommended values

Fit statistics	**χ^2**	**df**	**RMSEA**	**TLI**	**CFI**
Five factors	488.057	265	0.050	0.964	0.968
Recommended	-	-	< 0.05	> 0.90	> 0.90

Note. χ^2 = Discrepancy Chi-Square; df = Degrees of freedom; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis Index; CFI = comparative fit index

The path diagram in Figure 1 shows that the correlation between the respective constructs exceeds 0.85. Jin *et al.* (2012) also reported that the inter-correlation among the factors was quite high for a sample of Chinese graduate students. The correlation matrix in Table 4 also shows that there is no significant relationship that exists between goal selection and all other constructs, such as career planning, problem-solving ability, self-appraisal and the behaviour of seeking occupational information. Hence, the CDSES can be used in understanding the career behaviour, but the five-factor first order model may not be the best in modelling career decisions for Malaysian university students.

Table 4. Correlation matrix

	Goal selection	**Career planning**	**Problem-solving**	**Self-appraisal**	**Occupational information**
Goal selection	1				
Career planning	0.069	1			
Problem-solving	0.038	0.792**	1		
Self-appraisal	-0.011	0.717**	0.762**	1	
Occupational information	0.038	0.686**	0.713**	0.785**	1

**Significant at p-value < 0.000

IV. CONCLUSION AND RECOMMENDATION

This study aimed to explore the potential utility of CDSES-SF in understanding the career behaviour of undergraduate students in Malaysia. Confirmatory factor analysis was employed using a five-factor model as in Betz *et al.* (1996) to investigate the factor structure of the CDSES-SF for Malaysian undergraduates. Since this study only explored the potential of the theory used in Taylor and Betz (1983) in developing the CDSES using five-factor first order model, and although most of the fit indices acceptably fit the requirements, the relationship between goal selection is poorly related across the constructs. The results show that a positive correlation exists between the four factors, except for the factor "Goal". Although Malaysian undergraduates might possess all four factors, this does not necessarily imply that they are goal-oriented, which may consequently contribute to lower adaptation in the job-hunting field.

The results by Jin *et al.* (2012) and Hampton (2005) are also consistent with the same method used in this study, but with different samples in the United States and China. The analysis shows that when the five-factors were imposed on both samples, both showed an unclear structure. Therefore, it can be concluded in this study that CDSES-SF is a reliable measure, but its final structure has not been yet established for Malaysian university students. This has also occurred in the study by Török *et al.* (2017).

Several different directions could be taken for future research in the development of the decision-making self-efficacy construct. The five-factor model fit the data collected through CDSES-SF; and several other alternatives can be explored further, such as a bifactor model or hierarchical model. Although the results of the confirmatory factor analysis based on the five-factor sufficiently fit the data, further exploratory analysis can be performed to determine the best alternative model in estimating the actual factor structure of the CDSES-SF for Malaysian undergraduates. There might be a different perception towards career planning based on gender, family influences, and diverse cultures, as discussed by Watson *et al.* (2001). These factors can be considered for future work in this area.

V. ACKNOWLEDGEMENT

The authors would like to thank Siti Amalina binti Mohd Ripan, Nur Athirah binti Mohd Salleh and Nurulatiqah Asmira binti Anuar for their assistance in the data collection process. The authors would also extend the highest appreciation to Penyelidikan dan Jaringan Industri (PJI), UiTM Cawangan Pahang for partially funding their research.

VI. REFERENCES

Ang, JW, Murugasu, A & Chai, YW 2018, 'Low-skilled foreign workers' distortions to the economy', Economic Developments in 2017, Annual Report.

Annie, MNW & Hamali, J 2006, 'Higher education and employment in Malaysia', International Journal of Business and Society, vol. 7, no. 10, pp. 66-76.

Armum, P & Chellappan, K 2016, 'Social and emotional self-efficacy of adolescents: measured and analysed interdependencies within and across academic achievement level', International Journal of Adolescence and Youth, vol. 21, no. 3, pp. 279-288.

Awang, Z 2012, Structural equation modelling using AMOS graphic, UiTM Press.

Bandura, A 1986, Social foundations of thought and action: A social cognitive theory, Prentice-Hall, New Jersey.

Bentler, PM & Bonett, DG 1980, 'Significance tests and goodness of fit in the analysis of covariance structures', Psychological Bulletin, vol. 88, pp. 588–606.

Betz, NE, Hammond, MS & Multon, KD 2005, 'Reliability and validity of five-level response continua for the career decision self-efficacy scale', Journal of Career Assessment, vol. 13, pp. 131–149.

Betz, NE, Klein, K & Taylor, K 1996, 'Evaluation of a short form of the career decision-making self-efficacy scale'. Journal of Career Assessment, vol. 4, pp. 47-57.

Betz, NE & Luzzo, D 1996, 'Career assessment and the career

decision-making self-efficacy scale', Journal of Career Assessment, vol. 4, pp. 313-328.

Cheong, KC, Hill, C, Fernandez-Chung, R & Leong, YC 2016, 'Employing the 'unemployable': employer perceptions of Malaysian graduates', Studies in Higher Education, vol. 41, no. 12, pp. 2253-2270.

Crites, JO 1978, Career Maturity Inventory, CTB/McGraw Hill, Monterey.

Fook, CY, Dalim, SF, Narasuman, S, Sidhu, GK, Fong, LL & Keang, KM 2015, 'Relationship between active learning and self-efficacy among students in higher education', International Academic Research Journal of Social Science, vol. 1, no. 2, pp. 139-149.

Gaudron, JP 2011, 'A psychometric evaluation of the career decision self-efficacy scale–short form among French university students', Journal of Career Assessment, vol. 19, no. 4, pp. 420-430.

Hair, J, Black, W, Babin, B & Anderson, R 2010, Multivariate Data Analysis, Prentice Hall, New Jersey.

Hampton, ZN 2005, 'Testing for the structure of the career decision self-efficacy scale-short form among Chinese college student', Journal of Career Assessment, vol. 13, pp. 98–113.

Hanapi, Z & Nordin, MS 2014, 'Unemployment among Malaysia graduates: graduates' attributes, lecturers' competency and quality of education', Procedia-Social and Behavioral Sciences, vol. 112, pp. 1056-1063.

Holmes-Smith, P, Coote, L & Cunningham, E 2006, Structural equation modeling: from the fundamentals to advanced topics, Streams, Melbourne.

Jin, L, Ye, S & Watkins, D 2012, 'The dimensionality of the career decision self-efficacy scale-short form among Chinese graduate students', Journal of Career Assessment, vol. 20, no. 4, pp. 520-529.

Kelloway, EK, 1998, Using LISREL for structural equation modeling: a researcher's guide, Sage Publications Inc, Thousand Oaks.

Kline, RB 2005, Principles and practice of structural equation modelling, 2nd edn, Guilford Press, New York.

Lam, M & Santos, A 2018, 'The impact of a college career intervention program on career decision self-efficacy, career indecision, and decision-making difficulties', Journal of Career Assessment, vol. 26, no. 3, pp. 425-444.

Mohd Ibrahim, DH & Mahyuddin, MZ 2017, 'Youth unemployment in Malaysia: developments and policy considerations', Outlook and Policy, Annual Report.

Presti, AL, Pace, F, Mondo, M, Nota, L, Casarubia, P, Ferrari, L & Betz, NE 2013, 'An examination of the structure of the career decision self-efficacy scale (short form) among Italian high school students', Journal of Career Assessment, vol. 21, no. 2, pp. 337-347.

Tabachnick, BG & Fidell, LS 2007, Using multivariate statistics, 6th edn, HarperCollins, New York.

Taylor, KM & Betz, NE 1983, 'Applications of self-efficacy theory to the understanding and treatment of career indecision', Journal of Vocational Behavior, vol. 22, no. 1, pp. 63-81.

Ting, SH, Marzuki, E, Chuah, KM, Misieng, J & Jerome, C 2017, 'Employers' views on importance of english proficiency and communication skill for employability in Malaysia', Indonesian Journal of Applied Linguistics, vol. 7, no. 2, pp. 315-327.

Török, R, Tóth-Király, I, Bőthe, B & Orosz, G 2017, 'Analysing models of career decision self-efficacy: first-order, hierarchical, and bifactor models of the career decision self-efficacy scale', Current Psychology, vol. 36, no. 4, pp. 764-773.

Watson, MB, Brand, HJ, Stead, GB & Ellis, RR 2001, 'Confirmatory factor analysis of the career decision-making self-efficacy scale among South African university students', Journal of Industrial Psychology, vol. 27, no. 1, pp. 43-46.