Research Article:

Psychometric Properties of the Quality of Undergraduate Learning Experiences in Malaysian Universities

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ABSTRACT

Malaysian higher educational institutions are bracing to compete at the international level with the institutions that produce evidence of quality teaching and learning and positive students' experiences. In this matter, students' engagement in learning activities has been heralded as a quality indicator of the higher educational institutions' performance as well as undergraduate students' learning. However, there is a need to examine the level of undergraduate learning engagement based on the principles of good educational practices and a need to provide empirical evidence of the extent to which higher educational institutions in Malaysia support undergraduates' learning and growth. For this purpose, the current study proposes a framework for quality teaching and learning in Malaysia by developing a measurement instrument to measure the quality of undergraduates' learning experiences (QULEX) in Malaysian higher education. The current study evaluated the reliability and factor structure of the QULEX using a sample of 1,892 Malaysian undergraduate students. QULEX consists of 12 factors with 47 items to measure the quality of undergraduates' learning experiences. The factor structure of the QULEX was examined by employing exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The findings showed that items loadings, composite reliability, convergent validity, and discriminant validity of the variables provide robust empirical evidence to support the implementation of QULEX in the Malaysian academic context. The findings from this study will inform policymakers and practitioners upon student feedback concerning the variables that will derive teaching and learning excellence.

Keywords: Factor analysis, Malaysian universities, psychometric properties, undergraduate learning experiences

INTRODUCTION

In recent years, measurement of quality at the tertiary level has received phenomenal interest across the globe as it determines success not only for students' academic and personal gains but also for sustained economic growth of a nation. However, the definition of quality for institutions of higher education is multidimensional depending on stakeholders' interests and the quality indicators that evolve as per global and local demands (Lalić, 2017). Some of these indicators have a direct causal impact on college quality whereas some serve as proxy items indicating quality (Matsudaira, 2016). For example, in the case of university rankings indicators, Lalić (2017) stated that "these indicators represent only proxy measurement of teaching quality because they do not evaluate whether higher education institutions prepare students for the labour market and contribute to their social and personal development" (p. 2). Hence, little is known about students' experiences, who are the principal stakeholders, of what they do or experience in their classrooms at that HEI.

In order to demonstrate evidence and improve undergraduate educational quality, the National Survey of Student Engagement (NSSE) annually gathers reliable information from several HEIs across the United States. There is numerous empirical evidence that confirms that this survey driven insight has driven institutional change in areas informed by the survey (McCormick & Kinzie, 2014). Similarly, the Teaching Excellence Framework (TEF) was announced by the UK government to assess the quality of teaching. The TEF measures teaching excellence in three key areas: teaching quality, learning environment, student outcomes (Gunn, 2018). Besides these two major examples, there are numerous other surveys such as the Australasian Survey of Student Engagement (AUSSE), Student Experience in the Research University (SERU), Dutch National Student Survey (NSE), Irish Survey of Student Engagement (ISSE), and Student Engagement Questionnaire (Kember & Leung, 2009) that have successfully served the purpose of measuring the quality of HEI for years.

Both NSSE and TEF surveys show evidence of robust psychometric properties, with satisfactory reliability and validity. They provide information for performance indicators and can be utilised by HEIs to improve undergraduate learning experience. If used correctly, they can provide important information on areas that need enhancement activities. On the contrary, incorrect use may lead to biased and misleading findings. Of the two instruments, NSSE is more comprehensive as it is based on Chickering and Gamson's (1987) "Seven Principles for Good Practice in Undergraduate Education". These principles employ the elements of activity, expectations, cooperation, interaction, diversity and responsibility. Besides, they are intended as guidelines for faculty members, students and administrators to improve teaching and learning and are driven from decades of research into the way students learn and teachers teach. Realising the importance of examining student development scientifically, this study aims to develop instruments that

can measure undergraduate learning experiences that also take into account the culture of local higher educational institutions.

In Malaysia, the Ministry of Higher Education (MOHE) Malaysia has long been aware of the critical role teaching and learning plays in forming positive students' experiences in HEI. For example, since 2007 MOHE has initiated outcome-based education (OBE) with the belief that students can benefit from any educational programme only when the instructional outcomes can be measured as a result of any instruction. Additionally, to produce future-proof talents with a first-class mentality, teaching and learning in higher education institutions (HEIs) has been designated as one of the institutional pillars and a critical agenda in the National Higher Education Strategic Plan (PSTPN 2007–2015). Through PSTPN, HEIs were driven using two approaches: First, by strengthening learning programmes based on knowledge, high impact research via close academic-industry ties and being elitist in terms of achievements and social services. Secondly, HE will be more open in nature by emphasizing continuous life-long learning and offering more opportunities and space for students' mobility in receiving education and training (MOHE, 2012). A similar agenda was further delineated under the National Higher Education Blueprint 2015–2025 launched in 2015. To achieve these desired outcomes, The National HE Blueprint stipulated that HEIs through their own initiatives, should provide an ecosystem that will enhance students' 21st-century skills through experiential learning (MOHE, 2016). The document further necessitates the need for engaging students in personalised learning through the use of technology-enabled learning models.

In addition, two main reasons make Malaysian HEIs move towards earnestly adopting a measure of students' feedback all across the nation on their experiences. First, the Malaysian Higher Education Blueprint 2015–2025 implicitly articulates its ambition to emerge as a world-class higher education system to benefits its graduate and the nation. For the current and the prospective Malaysian graduates, the National Higher Education Strategic Plan's Critical Agenda Project (launched during the inception of the PSPTN (National Higher Education Strategic Plan) 2007–2015 numbers 16 and 18 seek "Holistic Student Development", and quality "Teaching and Learning" for its graduates. The Strategic Plan seeks to produce "Balanced Entrepreneurial Holistic Graduates." Despite these aspirations, an evident trend of unsatisfactory graduate unemployability, prolonged graduation periods, and a huge gap between the competences acquired at the university and the competencies required by the market (Ang, 2015; Awang-Hashim et al., 2015; Cheong et al., 2015; Ting & Ying, 2012), suggests that Malaysian HEI require increasing focus on HEI's quality of teaching as well as on the institutional arrangements for quality assurance and enhancement.

As a quality indicator of a successful HEI, research has shown that evidence of student engagement in learning activities contribute significantly towards measuring the quality of the HEI's performance and students' learning (Awang-Hashim et al.,

2015; Chen et al., 2014). As Kuh (2003) puts it, "… the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development…. Those institutions that are more fully engaged with their students in the variety of activities that contribute to valued outcomes can claim to be of a higher quality compared with similar colleges and universities" (p. 1). Kuh (2003) further argues that it is vital for universities to provide meaningful educational experiences for students in order for them to be academically inclined and morally sound. Thus, there is a need to examine the level of undergraduate learning engagement based on the principles of good educational practices (see Chickering & Gamson, 1987) and a need to provide empirical evidence of the extent to which HEIs in Malaysia support undergraduates' learning and growth.

Second, Malaysian HEIs are not merely seeking to influence and accomplish national goals but also focusing on expanding their global capability through internationalisation agenda to become an education hub by 2025. By acknowledging the fact that higher education is now recognised as a service industry (Cheng & Tam, 1997), Malaysian HEIs are now focused on providing quality learning experiences to the students (service), who are the principal stakeholders in internationalisation agenda, thus enabling Malaysia to realise its dream of becoming an education hub. Therefore, by deploying a reliable and valid measure to seek students' experiences, the HEI in Malaysia would be able to restructure or adapt to match the international standards by continuous monitoring. Furthermore, to meet the internationalisation and ranking agenda, Malaysia is bracing to compete at the international level with the institutions that produce evidence of quality teaching and learning and positive student experiences. Therefore, it also requires a valid, reliable and robust instrument of international equivalency to share data at international level with credence for its current educational quality.

In line with the above agenda, MOHE introduced a Rating System for Malaysian Higher Education Institutions known as SETARA in 2012 to promote institutional excellence as well as to recognise the diversity among Malaysian universities. Later in 2017, SETARA2017 was revised to help universities to deliver their fundamental roles in teaching, research and services via appropriate assessment and evaluation metrics. One of this rating instrument's core functions is to promote teaching excellence. However, the recent Student Satisfaction Index (SSI) measured in SETARA2017 has yet to consider the students' voices on their learning experience and what they actually do during their undergraduate years in university. For example, Yaacob et al. (2019) stated that although the curriculum is the heart of instruction, there are absence of students' manifestation of desired learning experiences and faculty members should connect the formal curriculum with students' experiences which imbibe from non-formal, informal, and alternative settings. In addition, SETARA did not address some issues and there were excessive complaints mostly from private institutions that existing upgrading system is too burdensome, overly duplicative, not transparent and vulnerable to human subjectivity therefore no sustainable (Ashikin et al., 2013). Yet, it is the

ranking systems that assist potential students to select the appropriate institutions and academic programmes for their tertiary education and took no specific account of each university's constituent departments or what are the indicators of students experiences in higher educational institutions (Yaakub & Mohamed, 2019).

Universities as major stakeholders play an important role in developing new knowledge and skills (Zainal Abidin et al., 2021). Therefore, the current study proposes a framework for quality teaching in Malaysia by developing a measurement instrument to measure the quality of undergraduates' learning experiences (QULEX). Learning experiences include experience with lecturers, deep and meaningful learning, peer learning, campus life, relatedness, and moral and ethical development. Having a valid, reliable and robust instrument of international equivalency that captures students' voices of their undergraduate learning experiences of engagement based on the principles of good educational practices would not only produce evidence of quality teaching and learning and positive students experiences at the international level but also would help HEIs in Malaysia to measure the level of students engagement and drive quality teaching and learning for undergraduates' learning and growth. In addition, the feedback driven from this assessment tool may serve the following functions:

1. To describe the extent to which students are engaged in learning.

2. To tap on the effective educational practices that help define a university's contribution to the actual educational experiences of undergraduates.

3. To serve as a guideline for helping students and parents to choose HEI based on the quality of the education (teaching and learning) and the services (facilities) that the students experience themselves.

4. To complement SETARA (university rating instrument developed by MOHE) evaluation that is conducted by MOHE Malaysia.

5. To enable HEIs to assess their quality of education and services, hence enabling them to take appropriate measures to enhance their performance towards excellence.

6. To derive quality teaching and learning in HEIs across Malaysia for students' engagement.

QULEX instrument development is grounded in the theory of psychosocial development (Chickering & Gamson, 1987). The theory highlights the role of campus life in students' development as well as class learning experiences which are embedded in the seven vectors which act as guidelines to good practices in HEIs (developing competence, managing emotions, moving through autonomy toward interdependence, developing mature interpersonal relationships, establishing identity,

developing purpose, developing integrity). For example, by participating actively in university, the students are exposed to a range of potential career opportunities (Lien, 2002; Liversage et al., 2018) which facilitates them to chart their future. This is in line with the belief that university is a place where students develop their character while studying (Chickering & Reisser, 1993). Ultimately, good campus life prepares students with a holistic academic and social life experiences to withstand challenges in the later life (Smith & Renk, 2007). Interestingly, strong psychosocial development is essential during early enrolment in higher learning institutions (Martin, 2000; Tinto, 1993).

In addition, classroom learning experiences are crucial as frequent student-lecturer contact in and out of class is an important factor in facilitating student motivation and involvement. Through consistent interaction between students and lecturers, values may be shared and discussed. Thus, it will not only enhance students' intellectual commitment but also encourage them to examine their own values in society. Ayub et al. (2020) found that following critical reflection, student-faculty interaction has emerged as the second most important factor that directly improves students' satisfaction with the quality of their educational experiences. Students need frequent opportunities to perform and receive suggestions for improvement. At various points during college, and at the end, students need chances to reflect on what they have learned, what they still need to know, and how to assess themselves. Fortunately, technology provides some relief in providing opportunities for self-grading quizzes, comments and annotated assignments and chat (Long et al., 2016). These facilities allow students to work at their own pace and receive prompt feedback on their performance respectively. Thus, it is important for institutions of higher learning to play their roles in providing a conducive learning environments to cater to academic and non-academic needs. This is where management teams in the universities need to be proactive in preparing the right academic and non-academic orientations for the students.

METHODOLOGY

Three phases were followed to complete this study. First, establishing a benchmark that consists of desk reviews, study visits and benchmarking, and expert interviews and engaging stakeholders (interview and focus group) were used to generate items. Items are designed to encompass the content domain of the construct of interest. Second, we culled the resulting item pool to remove items that: (a) did not follow best practices in item generation (e.g., double-barrelled items or difficult to understand) (Hinkin, 1998), or (b) which were not applicable across undergraduate learning experience. In the third step, with the remaining items, we examined the dimensionality of the QULEX construct and the relationship of the proposed measure(s) with established measures of theoretically relevant attitudinal variables using a sample of undergraduate students in Malaysian universities.

Preliminary Work: Items Generation

Two desk reviews and benchmarking visits were made for the development of the instrument. Desk review activities included scanning the literature, analysing secondary data, and creating a reference list, so that all documents are organised and easily accessible to all team members. By collecting, organising and synthesising available information, the team gains an understanding of the Malaysian context, students' learning experience and quality in teaching and learning, and equally important, identifies gaps to address during the fieldwork.

The first benchmarking took place at NSSE in the Centre for Postsecondary Research (CfPR), Indiana University and three other participating universities. The research team analysed the policies and practices of CfPR by reviewing the strategic documents of the centre before the visits. The second benchmarking visit was conducted at the TEF UK (Teaching Excellence Framework) Office for Student (OfS) and two other participating universities. Interview protocols with the CfPR, OfS and participating universities focused on issues and challenges in developing the survey instruments and the benefits.

The visits to these two centres and participating universities enabled the team of researchers to learn the process of developing the instruments, analysing data, and managing reporting quality of teaching and students' learning experiences that can be useful for the Ministry of Higher Education plans. The visits also enlightened the researchers with the issues and challenges faced by the agencies and the participating universities.

The second phase included engaging stakeholders through interviews and focus group in English and Malay language. Data was collected using: (a) face-to-face interviews using semi-structured interview questions, each session lasting for 30 minutes to 2 hours; and (b) Focus group discussion (FGD) each session lasting for 75 to 90 minutes. Participants were final year undergraduate students enrolled at Malaysian universities that were selected using purposive sampling. The present study selected final year students as they have spent a significant number of years as undergraduates and would have rich experiences to contribute their perspective. Interview protocol for both face to face interviews and focus group was developed following seven principles for good practice in the undergraduate education framework (Chickering & Gamson, 1987). The protocol also incorporated appropriate probing questions to elicit as much information as possible from the respondents.

Participants

The target population of the study is Malaysian undergraduates at public and private universities of Malaysia. The universities were chosen based on the following criteria:

1. Ownership (public or private).

2. Type (research, comprehensive and focus university).

3. SETARA classification (emerging, mature and unqualified).

4. SETARA rating (1 to 6 stars).

Using stratified and cluster sampling methods, the sample consisted of 1,892 (631 males, 1,261 females) undergraduates enrolled in 18 universities in Malaysia (10 public and eight private universities). Ages ranged from aged 18 to 27 years (M = 21.90, SD = 1.96). The majority of the respondents were 22 years old representing approximately 35%, followed by 21 and 23 years old which represented about 21% and 18%, respectively. Only a small portion of the respondents were aged more than 27 years. 1133 (59.9%) of student were enrolled in public universities and 759 (40.1%) were from private universities. For ethnicity, the sample was ethnically diverse, with Malay (n = 1107; 58.5%) constituted a slight majority of the participants, Chinese (n = 529, 28%), Indian (n = 76; 4%), and others such as international students (n = 180; 9.5%).

Procedure

Data was collected by identifying a person in charge (PiC) in each university before data collection. The day and time for the data collection were arranged with the PiCs and they were informed of the two online and hardcopy versions. Hardcopy version was used to accommodate circumstances where the link was inaccessible either due to poor loading, poor internet network coverage or technical glitches due to the use of handphones. The PiC arranged for the students from the various courses in the university to meet in a pre-identified venue. Hardcopy versions were given to students who could not access the online version and they answered in their preferred language (English language). A standard set of instructions were read to them in Malay, English or both languages depending on the students' preference.

Measures

The survey items for the study were adapted from various established instruments as NSSE and TEF. For having dual versions, the items were also translated into Malay language by experts in the field according to scientific standard procedures. Two pilot studies were conducted to examine the appropriateness of the items and the reliability of the survey instrument. Problematic items were reviewed and improved. Descriptions of the measured scales are shown in Table 1.

Table 1. Description of scales

Scale	Dimensions	Operational definition	No. of items	Sample of items
1. Experiences with lecturers	Teaching Quality	The level of students' satisfaction on teaching that emphasises on student comprehension and learning with clear explanations and use of illustrative examples.	5	Teaching staff use examples or illustrations to explain difficult points.
	Feedback and Assessment	Providing timely, helpful and effective feedback for quality learning.	4	Teaching staff provide prompt feedback on my coursework.
	Student-Faculty Interaction	The amount of meaningful interactions with between students and lecturers (such as talking about career plans, working on committees or students' group, discussion course material outside of class, or discussing their academic performance).	4	How often have you talked about career plans with any teaching staff?
2. Deep and meaningful learning	Higher Order Thinking	Amount of coursework emphasised challenging learning tasks including applying learned information to practical problems, analysing ideas and experiences, and forming new ideas from various pieces of information.	3	How often did you apply facts, theories or methods to solve new problems?
	Reflective and Integrative Learning	How often students made connections with prior knowledge, other courses, and societal issues, took into account diverse perspectives, and reflected on their own views while examining the views of others.	6	How often have you integrated ideas from different courses/ modules/subjects when completing assignments?
3. Peer learning	Collaborative Learning	Refers to how often students collaborated with others in mastering difficult material by asking for help, explaining material to others, preparing for exams, and working on group projects.	5	How often have you worked with another student to help you understand course material?

Table1 (Continued)

Scale	Dimensions	Operational definition	No. of items	Sample of items
	Experience with Diversity	Refers to how often students had discussions with peer who differ from themselves in terms of gender, race or ethnicity, economic background, religious belief, or political views.	5	How often have you had discussions with peers from a different ethnicity/religion?
4. Campus life	Supportive Environment	The extent the institutions provided supportive ecosystem to facilitate student personal development and well-being - healthy campus life).	3	Please state your level of satisfaction on the opportunities to be involved in social activities.
	Up-to-date Academic Support	The extent the institutions provided academic support services.	3	Please state your satisfaction on the academic advice/ support when you needed.
	Quality of Interaction	Refers to how students rated their interactions with significant people in their learning environment, including other students, academic advisors, lecturers, student services and other administrative staff members.	3	Please state your level of satisfaction on your interaction with lecturers/teaching staff.
5. Relatedness	Diversity and Inclusion	The extent students feel accepted and valued by the campus community.	3	How often did you receive opportunities and recognition similar to other peers?
6. Moral and ethical development	Moral and Ethical Development	The extent institution emphasizes moral and ethical development.	3	How often has your institution encourage you to think ethically and morally?

Experience with lecturers

Students' experiences with lecturers were evaluated using three subscales: teaching quality, feedback and assessment, and student-faculty interaction. Items were assessed using a six-point Likert scale ranging from 1 (never) to 6 (always). Teaching quality (5 items) assessed the student's level of satisfaction teaching that emphasizes on the student (e.g., "teaching staff use examples or illustrations to explain difficult points?"). The feedback and assessment subscale (4 items) measures students' experience

regarding perceived effective feedback during learning (e.g., "teaching staff provide prompt feedback on my coursework?"). Student-faculty interaction (4 items) measured the quantity of interactions among students and their instructors (e.g., "how often have you talked about career plans with any teaching staff.").

Deep and meaningful learning

The deep and meaningful learning scale was evaluated with two subscales: higher-order thinking and reflective and integrative learning. Items were assessed using a six-point Likert scale ranging from 1 (never) to 6 (always). Higher-order thinking (3 items) subscale assessed how students solve challenging problems using various activities (e.g., "how often did you apply facts, theories or methods to solve new problems?"). Reflective and integrative learning subscale (6 items) measured how students integrate previous experience, several subjects, and societal problems (e.g., "how often have you integrated ideas from different courses/modules/subjects when completing assignments?").

Peer learning

The peer learning scale was measured using two subscales: collaborative learning and experience with diversity. Items were evaluated via six-point Likert scale points ranging from 1 (never) to 6 (always). Collaborative learning (5 items) indicates students' collaboration with peers to master challenging tasks by help-seeking, clarifying material to others, and being involved in group tasks (e.g., "how often have you worked with another student to help you understand course material?"). Experience with diversity (5 items) refers to students' discussions with peers from different gender, race, economic status and religions (e.g., "how often have you had discussions with peers from a different ethnicity/religion?").

Campus life

This variable was measured using three subscales: supportive environment, up-to-date academic support, and quality of interaction. Items were evaluated using six-point Likert scale, from 1 (very dissatisfied) to 6 (very satisfied). Supportive environment (3 items) assessed students' satisfaction with the institution's support to facilitate their personal growth, welfare, and healthful campus life (e.g., "Please state your level of satisfaction on the opportunities to be involved in social activities"). Up-to-date academic support subscale (3 items) measured students' satisfaction towards their institution's academic support and services (e.g., "Please state your satisfaction on the academic advice/support when you needed"). Quality of interaction (3 items) refers to how students evaluated their interactions with significant individuals in learning contexts (e.g., "Please state your level of satisfaction on your interaction with lecturers/teaching staff").

Relatedness

The relatedness scale was assessed with a subscale, which is the diversity and inclusion dimension (3 items) that measured the extent to which students feel accepted and valued by the campus community (e.g., "how often did you receive opportunities and recognition similar to other peers?"). Items were evaluated using a six-point Likert scale ranging from 1 (never) to 6 (always).

Moral and ethical development

The moral and ethical development scale (3 items) measured the extent institution emphasizes moral and ethical development (e.g., "How often has your institution encourage you to think ethically and morally?"). Items were assessed using a six-point Likert scale ranging from 1 (never) to 6 (always).

DATA ANALYSIS

We conducted exploratory factor analysis (EFA) of the 47 QULEX items, using Principal Component Analysis with varimax rotation. In the next step, we performed confirmatory factor analysis (CFA) for testing our measurement model using structural equation modelling (SEM) via AMOS. We used CFA to calculate composite reliability (p), discriminant validity, and convergent validity using average variance extracted (AVE). Discriminant validity is determined when none of the associations between the latent variables surpassed the threshold value of 0.90 (Kline, 2011). Furthermore, reliability and convergent validity are determined when the values of composite reliability (ρ) and AVE go above 0.60 (Bagozzi & Yi, 1988) and 0.50 (Hair et al., 2010), respectively. The goodness-of-fit of model was assessed by evaluating the root mean square error of approximation (RMSEA) with 90% confidence interval (CI), standardised root mean square residual (SRMR), Tucker-Lewis index (TLI), and the comparative fit index (CFI). The df was used to lessen the sensitivity of the χ^2 test to sample size. As a rule of thumb, χ^2/df value of 3 or less signifies a good fit of the model (Kline, 2011). Following Hu and Bentler (1999), cut-off values of RMSEA ≤ 0.06, SRMR ≤ 0.08, TLI ≥ 0.95, and CFI ≥ 0.95 were used to indicate excellent model fit.

RESULTS

Table 2 depicts descriptive statistics of all variables such as mean, standard deviation, Cronbach's alpha, normality and Pearson correlation. All variables showed good internal consistency ranging from 0.81 to 0.89. All values for skewness and kurtosis were within the −1 and +1 range (Leech et al., 2005), indicating a normal distribution

of data. All Pearson correlation coefficients were positive and significant, ranging from 0.31 to 0.71.

Table 2. Descriptive statistics, reliability and normality of the constructs

	1	2	3	4	5	6	7	8	9	10	11	12
1. Teaching quality	-											
2. Feedback and assessment		-										
3. Student-Faculty interaction			-									
4. Higher order thinking			0.52**	-								
5. Reflective and integrrative learning			0.52**		-							
6. Collaborative learning			0.43**			-						
7. Experience diversity			0.31**				-					
8. Supportive environment			0.39**					-				
9. Up-to-date academic support			0.37**						-			
10. Quality of interaction			0.35**							-		
11. Relatedness			0.53**								-	
12. Moral and ethical development			0.36**									-
M	4.56	4.21	3.32	4.23	4.22	4.47	4.31	4.39			3.73	
SD	0.85	0.96	1.18	0.97	0.85	0.92	1.04	0.92				
Cronbach's alpha	0.84	0.85	0.88	0.89	0.89	0.86	0.84	0.85			0.85	
Skewness		−0.15	0.24	−0.07	0.01		−0.19	−0.46			0.10	
Kurtosis		−0.40	−0.46	−0.36	−0.38		−0.44	−0.02				

Notes: ** *p* < 0.01, M = mean, SD = standard deviation

The results of EFA yielded a twelve-factor solution, as shown in Table 3. All items loaded on their designated factors with accepted loadings values ranging from 0.53 to 0.79. The Kaiser-Mayer-Olkin (KMO) measure revealed a value of 0.97, which is above the threshold value of 0.70 (Leech et al., 2005). The twelve extracted factors accounted for 71.86% of the total variance.

Table 3. Results of factor analysis (EFA and CFA)

Constructs	Items	Loadings (EFA)	Loadings (CFA)	Composite reliability	AVE
Teaching quality	TQ01	0.73	0.64	0.84	0.51
	TQ02	0.74	0.73		
	TQ03	0.64	0.81		
	TQ04	0.62	0.75		
	TQ05	0.54	0.65		
Feedback and assessment	FA08	0.69	0.73	0.85	0.60
	FA09	0.70	0.87		
	FA10	0.58	0.74		
	FA11	0.70	0.75		
Student-aculty interaction	SF12	0.78	0.80	0.88	0.65
	SF13	0.76	0.76		
	SF14	0.79	0.84		
	SF15	0.79	0.83		
Higher order thinking	HO16	0.75	0.83	0.88	0.72
	HO17	0.73	0.89		
	HO18	0.60	0.83		
Reflective and integrative	RI19	0.53	0.77	0.88	0.57
	RI20	0.65	0.69		
	RI21	0.69	0.75		
	RI22	0.74	0.73		
	RI23	0.73	0.80		
	RI24	0.71	0.80		
Collaborative learning	CL25	0.68	0.76	0.85	0.53
	CL26	0.62	0.75		
	CL27	0.70	0.73		
	CL28	0.72	0.70		
	CL29	0.71	0.72		
Experience with diversity	ED31	0.73	0.69	0.84	0.53
	ED32	0.78	0.70		
	ED33	0.79	0.84		
	ED34	0.72	0.80		
	ED35	0.60	0.57		

Table 3 (Continued)

Constructs	Items	Loadings (EFA)	Loadings (CFA)	Composite reliability	AVE
Supportive environment	EN36	0.78	0.81	0.86	0.60
	EN37	0.78	0.87		
	EN38	0.77	0.85		
Academic support	AS40	0.57	0.84	0.84	0.64
	AS41	0.73	0.80		
	AS42	0.70	0.78		
Quality of interaction	QI43	0.60	0.66	0.81	0.59
	QI44	0.64	0.83		
	QI45	0.61	0.81		
Relatedness	IN48	0.71	0.88	0.85	0.67
	IN49	0.75	0.86		
	IN51	0.74	0.71		
Moral and ethical development	ME52	0.78	0.85		
	ME53	0.75	0.90		
	ME54	0.76	0.80		
KMO	0.97				
Bartlett's test of sphericity	*56453.57				
df	1,081				
Total variance explained	71.86				

The CFA model includes 12 related latent variables and 47 indicators (items). The CFA results showed that our measurement model had a very good fit indices: χ^2/df = 3 (χ^2 = 2894.105, df = 963) CFI = 0.96, TLI = 0.96, SRMR = 0.030, RMSEA = 0.033, 90% CI [0.031–0.034]. As shown in Table 3, composite reliability (ρ) and AVE surpassed the values of 0.60 and 0.50, respectively. Items loadings on their underlying factors were significant statistically. Loadings range from the value of 0.57 to the value of 0.90. Additionally, none of the correlations surpassed the value of 0.90, which means that discriminant validity was well established (see Kline, 2011). In addition, the measure of discriminant validity can be traced to the work of Fornell and Larcker (1981). Thus, Fornell-Larcker criterion has been the most commonly applicable measure of discriminant validity. Fornell-Larcker criterion requires that to establish discriminant validity the square-root of AVE of a latent construct should be higher its squared correlation with any other latent construct within a research model (Fornell & Larcker, 1981; Hair et al., 2011). Through application of this procedure, discriminant validity of all the latent constructs have been established as reported in Table 4.

Table 4. Discriminant validity (Fornell and Larcker's criterion)

Constructs	1	2	3	4	5	6
1. Peer learning	**0.828**					
2. Moral and ethical development	0.578	**0.850**				
3. Relatedness	0.569	0.598	**0.819**			
4. Experience with lecturers	0.695	0.661	0.676	**0.829**		
5. Deep and meaningful learning	0.793	0.622	0.613	0.804	**0.900**	
6. Campus life	0.684	0.737	0.704	0.779	0.667	**0.859**

DISCUSSION

The major objective of this study was to develop an instrument that measures the distinct elements of the quality of undergraduates' learning experiences (QULEX) using a sample of university students in Malaysia. The result revealed that all the variables met the internal consistency requirement. The EFA and CFA were then used to assess the construct validity and reliability of QUELX. The results of EFA and CFA showed that all items were highly related to their underlying factors which provide evidence for the structural validity of the scale. Furthermore, all the latent variables achieved the acceptable value of convergent validity and construct reliability. The findings revealed that QULEX is a multidimensional concept consisting of 12 valid and reliable dimensions: (1) teaching quality, (2) feedback and assessment, (3) student-faculty interaction, (4) higher order thinking, (5) reflective and integrative learning, (6) collaborative learning, (7) experience with diversity, (8) supportive environment, (9) academic support, (10) quality of interaction, (11) relatedness, and (12) moral and ethical development.

The current framework of QULEX is based on the established theory of psychosocial development (Chickering & Gamson, 1987), principles of seven good practices, and benchmarked instruments (NSSE and TEF), in providing a comprehensive guide to drive quality teaching and learning at the institutes of higher learning in Malaysia. We believe that with the development and validation of this robust tool that appropriately represents Malaysian higher education context and aspiration towards measuring undergraduate students learning experiences, we will be able to provide empirical evidence for the extent to which higher education institutions support undergraduates' positive learning experience and optimal growth. This is a significant implication to the extant literature of learning experience benchmarks since there is a paucity of research and scales that measure students' undergraduate experiences, particularly in Malaysia.

In terms of practical implications, the report on the graduate experience at the university brings issues to the fore and provides opportunities for discussion and improvement. By providing an assessment of "where we are" as an institution or university, the report also provides a baseline on how to measure future progress. This in turn will assist the universities in reviewing their support and services to the students and the ability to add or change where required. The information collected through the QULEX project can serve as a diagnostic as well as an evidentiary base for establishing policy and a broad spectrum of initiatives. With some of the jobs forecasted to be non-existent by the time the graduates graduate, this instrument enables institutions to move with the times, making relevant changes based on the learning experience of graduates, in a timely manner.

The data gathered from the scale can be used to determine the training requirements of the students as well as the lecturers and instructors. The findings will help in structuring professional development programmes or courses in areas where students and instructors are less effective, as well as informing instructors and faculty members about the training and development activities that are required to improve undergraduates' learning experiences strategies and their implementation. The successful deployment of a learning experiences intervention will assist students and instructors in improving their performance.

SUGGESTION FOR FUTURE RESEARCH

There are a few limitations that should be considered. Firstly, in this study, researchers have made sure that the instruments developed are reliable, valid and able to measure student learning experiences in higher institutions. However, given the ever-changing technology, we need to be prepared to ensure that the instruments used are appropriate to the current situation. Therefore, future research should into account the rapidly changes in the students' learning environments (e.g., e-learning environment). Secondly, it is a known fact that undergraduate learning experiences are alterable by intervention and the constructs should be measured before and after any given intervention to improve students learning experience. Thus, subsequent research could adopt an experimental or longitudinal design to test the effectiveness of QULEX and enhance students positive learning experiences in specific domains and test the effectiveness of the intervention. Thirdly, our research only assessed face-to-face instruction. It is imperative for future investigations to examine QULEX the difference between face-to-face, online, hybrid, and flipped classes to determine if students learning experiences differences exist based on mode of learning environment. Fourthly, although the evidence for the structural validity of the scale, the influence of covariates remains unexamined. For example, Chin et al. (2012) found that male students reported higher intrinsic motivation, extrinsic motivation, and ego orientation than female students. Chen et al. (2014) found that females reported higher than males in term of relatedness and experience with diversity, whereas males reported higher in terms of competence than females. Thus, future studies

must perform multi-group analysis that includes covariates (e.g., gender, age, ethnicity, prior experience and type of university).

CONCLUSION

Drawing from the extensive literature review analysis and qualitative analysis of experts' reviews and students' feedback, this study adds to the existing literature on students' learning experiences by developing an instrument to measure the distinct elements of the quality of undergraduates' learning experiences (QULEX). A built scale of QULEX was established and tested with data acquired from university students, based on the theory of psychosocial development, principles of seven good practices, and benchmarked instruments (NSSE and TEF). The rigorous validation process of the current study produces a valid and reliable instrument that consists of twelve distinct elements and 47 items to capture students' experiences of quality undergraduate learning experiences in Malaysian higher institutions. The psychometrically sound QULEX scale may assist the students, instructors, educators, researchers, and stakeholders in gaining substantial information on undergraduates' learning experiences. Undergraduates' learning experience is a significant topic that requires additional research in order to incorporate appropriate teaching and learning experiences to enhance the overall quality of higher institutions, particularly in Malaysia.

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