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Design and Testing of a Questionnaire on Employability Skills for Building Surveying Graduates in Malaysia

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ABSTRACT

The employability skills instrument is often used either to guide graduates on the critical skills or to measure their employability. Though extensive studies on employability skills have been conducted, few of the instruments developed focus on the particular skills to excel in building surveying graduates, and rarely go through a complete validation process. Therefore, a set of reliable employability skills questionnaire instruments was developed for this purpose. The process involved four key stages, including instrument development, validation, pilot testing, and reliability assessment. The validation will involve assessment by panel experts with expertise in measurement tools, language, and building surveying, while the reliability process depends on the responses during the pilot study. The results indicate that the questionnaire instrument reaches an excellent degree of agreement, and all items suggested have an excellent internal consistency and reliability. Thus, the questionnaire was valid and reliable in exploring the crucial employability skills required by building surveying graduates in Malaysia.

1. Introduction

Synonymous with the nickname “building doctor,” building surveyors are a profession that revolves around buildings and property. Their field of work can be associated with several key spaces such as development monitoring, strategic property advice, energy management, and sustainability [1]. The building surveying profession was first recognised and introduced in the United Kingdom, then later it was first introduced in Malaysia in the 1990s by the Royal Institute of Surveyors Malaysia (RISM), a registered surveyors’ organisation in Malaysia [2]. Since then, professional building surveyors have been recognised as “an eligible person, by assessment and practice, and also a registered member of the RISM with expertise such as providing advice on design aspects as well as construction, carrying out controls on building projects associated with construction activities during the lifetime of a building, and undertaking building maintenance and management” [12].

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Despite the increasing employment opportunities, the building surveying graduates, who were believed to fulfil the demand, seem to be underprepared for the job. Reported in the study by Husain *et al*., [3,4], the graduates were found to have a moderate performance level and an inadequate competency level stemming from the mismatch of skills possessed by graduates and demanded by the industry.

The rapid evolution of the construction sector has required building surveying graduates to possess a diverse set of employability skills to meet industry demands. Attribution from the increasing number of graduates each year has forced employers to seek professionals who not only have strong technical knowledge but also can demonstrate work-related skills such as critical thinking, problem-solving, communication and adaptability [5]. Still, the continuous modernisation of industry has demanded that graduates also be equipped with emerging skills such as digital proficiency and sustainability awareness [6]. The rising awareness of employability skills has encouraged many researchers to explore the key employability skills essential for graduates to be prepared for the workforce.

Employability skills (often known as soft skills) are transferable skills highly valued by employers and essential for better performance in the workplace. According to Yorke [7], employability is taken as: "*a set of achievement–skills, understanding and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy"*. Individuals with an adequate level of employability skills will be able to secure, maintain, and succeed in employment by effectively navigating job requirements and work environments. Despite the heated arguments about the components of employability skills, this study acknowledges the statement by Knight and Yorke [8] and Pool and Sewell [9] that employability skills encompass a combination of knowledge, skills, and attitudes necessary for workers to excel in their jobs.

Although the employability of built-environment graduates has been extensively studied, existing literature clearly reveals a significant and specific gap within the building-surveying discipline. Kenayathulla et al., [10] argued that employers often seek a particular set of skills from applicants that match the requirements of specific roles. Previous research has successfully identified broad groups of desirable graduate attributes—such as communication, teamwork, and critical thinking—yet these frameworks are usually not tailored to the distinctive technical and professional needs of building surveying (for instance, condition assessment and digital inspection workflows) [11]. Additionally, many current measurement tools remain at the conceptual mapping stage and rarely demonstrate the comprehensive validation process necessary for reliable application (including item analysis, reliability testing, face, content, and construct validity) [12].

To address these shortcomings, this study aims to develop and validate a discipline-specific questionnaire that captures the employability skills and the specialised technical competencies required of building-surveying graduates. The objectives guiding this development are four stages. First, to systematically map the competency domain by synthesising the literature, professional competency frameworks and curriculum documents, thereby producing a comprehensive item pool that reflects contemporary disciplinary needs. Second, to secure content and face validity through stakeholder engagement—using expert panels in the building surveying field, measurements and language. Third, to evaluate and refine the instrument through pilot testing. Fourth, to demonstrate the instrument's measurement quality and utility by reporting internal consistency and reliability.

2. Methodology

Mixed-methods research was undertaken, where a qualitative approach was used to develop the contents of the survey instrument and a quantitative approach to validate and pilot test the drafted questionnaire. A closed-ended questionnaire was developed, consisting of two main sections, with section A for the demographic data of the respondents and section B for constructs and items for employability skills.

2.1 Phases of the Questionnaire Development Process:

2.2.1 Phase 1a: Development of a conceptual framework and identification of domains

A conceptual framework is an important element needed in developing a new questionnaire. Therefore, the framework of the employability skills questionnaire takes its root from the theory by Knight and Yorke [8] and Pool and Sewell [9], whereas employability skills encompass the combination of knowledge, skills and attributes. In further exploring the domains, the "magic bullet" model by Harvey [13] was included. Harvey's model emphasises that the development process of employability involves three main parties, which are graduates, higher education institutions (HEIs) and employers.

2.2.2 Phase 1b: Generation of questions (items)

A Systematic Literature Review (SLR) method, utilising the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, was employed to generate and map the items under the identified key constructs of employability skills.

A total of 25 articles were selected for the SLR process, which were identified under the key terms of 'employability skills' and 'graduates' and 'surveyor'. The selected articles were not specified to the building surveyor due to a limited number of studies and articles published; therefore, the scope included the relevant fields within the construction industry. The generated items were mapped under the 5 key constructs as classified in the Malaysian Qualification Framework (MQF).

In fulfilling the requirement for the building surveying profession, the Building Surveyor Competency Standards, which were documented by the RISM, were adopted into the instrument. Combining the data from the sources, the domains and items were rearranged and modified to avoid duplication and confusion.

2.3 Phase 2: Assessing the Validity of the Questionnaire

2.3.1 Phase 2a: Face validity

In this study, face validity was assessed using the scores of five panels (three building surveying experts, one expert for measurement, and one expert for language) on the items. Throughout this procedure, the panels were requested to proffer their expert judgement on the paramount items and rate their significance using a 4-point Likert scale, where 1 = not essential; 2 = somewhat essential; 3 = quite essential, and 4 = highly essential.

The impact score for each item was calculated using the formula: Impact score = Frequency (%) x Importance, where frequency = ratio of experts who recognised the item as important, and importance = mean importance score attributed to the item [14]. The impact score of an item that is more than 1.5 was considered acceptable [15].

In addition to quantitative measurement, the panels were open to any additional comments and suggestions for improving the instrument's appearance, whether in terms of readability, consistency of style and clarity of the language used [16].

2.3.2 Phase 2b: Content validity

Similarly, with face validity, the content validity using a quantitative approach was applied to evaluate a newly developed instrument to ensure all items are important and eliminate undesirable items [16]. The same three panels from face validity, who were experts from the building surveying field, scored each item of the questionnaire based on its relevance to the measured domains using the following 4-point Likert scale: 1 = very unimportant, 2 = unimportant, 3 = important, and 4 = very important.

Content Validity Index (CVI) is a widely utilised method to quantify the content validity of an instrument [17], which is calculated at the item level CVI (I-CVI) and scale level (S-CVI). Both CVIs were calculated by categorising the 4-point Likert scale into two groups, whereas items scored 3 or 4 were recorded as one, and items scored 1 or 2 were recorded as zero.

For I-CVI, it is calculated by dividing the total item scored by the number of experts [17]. The cut-off point value for I-CVI is based on the number of experts. According to Lynn [18], an I-CVI score of 0.80 was required to be accepted if using a panel of 10 experts. In cases where the number of experts was five or fewer, Lynn recommended that the I-CVI score be 1.00 to be considered a cut-off point.

There are two methods to compute S-CVI: universal-CVI (S-CVI/UA) and average-CVI (S-CVI/Ave). UA-CVI was calculated based on the proportion of items that scored one divided by the total number of items [17]. Meanwhile, there are three ways to calculate Ave-CVI, whereas one of the ways is by dividing the total score of I-CVIs by the number of items [17]. In grading for both S-CVI/UA and S-CVI/Ave, the scores are considered to have excellent content validity, respectively having values ≥ 0.8 and ≥ 0.9 [19].

As there were limitations in CVI, Polit *et al*., [17] have suggested a new method for content validity, which is called a modified kappa k*, that helps adjust each I-CVI for chance agreement. The Kappa (K) was calculated using the following equation: $K = (\text{I-CVI} - P_c) / (1 - P_c)$, whereas the value of P_c (probability of chance agreement) was calculated using this formula: $P_c = [N! / A! (N-A)!] * 0.5^N$. where N = the number of experts and A = the number of agreeing on good relevance. The standard in evaluating kappa as proposed by Polit et al., (2007, as cited in [17]), where the value for each k* is fair (0.40-0.59), good (0.60-0.74), or excellent (k* > 0.74). In addition, the panels were also opened for any suggestions, as such, either needed for the elimination or addition of any item.

2.4 Phase 3: Pilot Testing

A pilot test was conducted in May 2024 through an online survey. The link was distributed to the participants with the selected characteristics, who must be registered with the RISM under the building surveying division and currently working in the building surveying field. A total of 30 participants were targeted to fulfil the requirement of 10% of the actual study for the pilot testing.

2.5 Phase 4: Assessing the Reliability and Validity of the Questionnaire
2.5.1 Phase 4a: Construct validity of the questionnaire

Due to the small sample size for a pilot study, this study is suitable for using the Pearson Correlation Coefficient to conduct construct validity assessment. The item validity assessment, using

the Pearson correlation, was based on the criterion that the value of r_{count} has to be more than r_{table} (Aspelmeier 2005, as cited in [20]). The critical value, $r_{table,}$ was determined based on the following procedure:

- Determine the degree of freedom, *df* whereas *df* = N (sample size) – 2
- Refer to "proportion in TWO tails" and refer to the value ".05" (95% confidence interval)

2.5.2 Phase 4b: Reliability of the questionnaire

The internal consistency measure that was used for reliability assessment is Cronbach's Alpha coefficient. It is considered the most appropriate reliability measure if planning to make use of the Likert scale [16]. As suggested by Hinton *et al*., [16], the four cut-off points for measuring reliability, include excellent reliability (0.90 and above), high reliability (0.70-0.90), moderate reliability (0.50-0.70) and low reliability (0.50 and below).

3. Results

3.1 Phase 1: Questionnaire Development

3.1.1 Phase 1a: Development of a conceptual framework and identification of domains

Referring to Harvey's theory, the development of employability for the graduates involves two other parties, which are HEIs as the provider and employers as the demander. Among the qualification guidelines developed by the Ministry of Higher Education (MOHE) and the Malaysia Qualification Agency (MQA), who both responsible for the development and qualification of higher education policy, strategy and programmes, the MQF was referred to. The MQF fits the objectives as it serves as a framework that standardises the qualifications and levels of higher education. Through the analysis, five domains were identified from the 'clusters of learning outcomes' section in the MQF.

For the employer's part, RISM, who serve as the organisation or community of building surveyors in Malaysia, was referred. Based on the competency standards set by the RISM, two other domains were identified. The initial draft of the employability skills framework for building surveying graduates with 7 domains, as displayed in Figure 1.

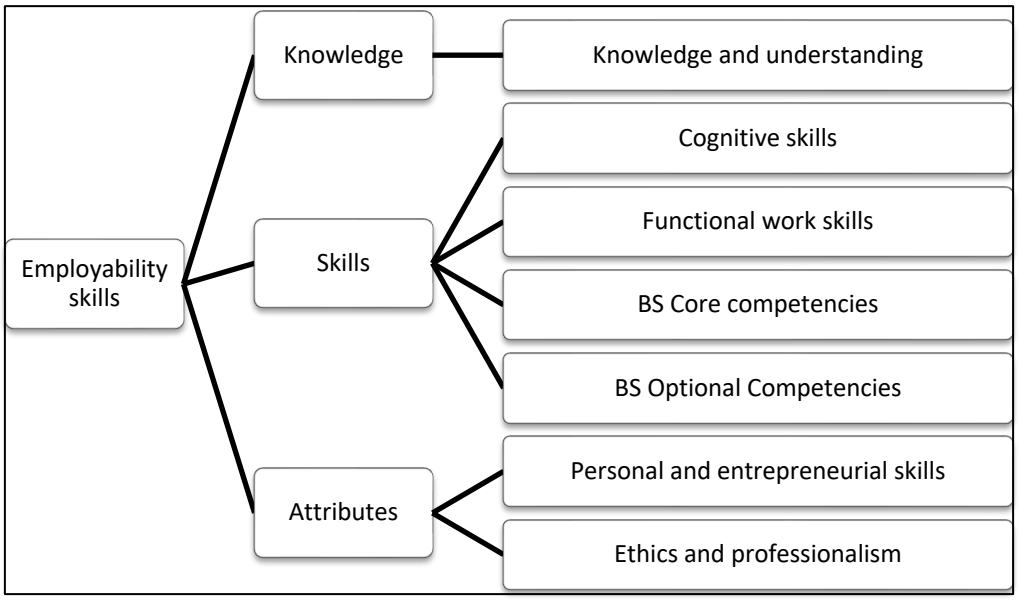

Fig. 1. Initial draft of the employability skills framework for building surveying graduates

3.1.2 Phase 1b: Generation of questions (items)

The thematic analysis identified 30 items of employability skills mapped under five main theme constructs as classified in the MQF. The result was based on the employer's perspective on the crucial employability skills for surveyor graduates. Among the five constructs, functional work skills had the most items identified.

For the specified employability skills sought in the building surveying profession, 17 items were identified under 2 sub-themes as guided by RISM: core competencies and optional competencies. Combining the two sets of items, the themes were arranged, and new sub-themes were developed under the functional work skills constructs. A first version of the questionnaire was developed, containing 9 constructs and 47 items (elements of employability skills) (Table 1).

Table 1
Identification of constructs for the employability skills survey instrument

Constructs	Description
Knowledge and understanding	A systematic understanding of facts, principles, concepts, and systems, the field of study or discipline, and basic everyday knowledge and the capability of relating their prior knowledge in the course, learning, or work.
Cognitive skills	Thinking or intellectual capabilities, and the ability to apply knowledge and skills.
FWS (Fundamental skills)	Basic skills for the individual to be able to conduct their job or tasks.
FWS (Core practical work skills)	Core competency for building surveyors.
FWS (Optional practical work skills)	Optional competency for building surveyors.
FWS (Interpersonal skills)	People skills, social skills, or social intelligence.
FWS (Management and organisational skills)	Planning, managing, and organising skills for building surveyors.
Personal and entrepreneurial skills	Personal skills or life skills and how they are portrayed through enthusiasm and their characters, while entrepreneurial skills relate to relevant knowledge, skills, and expertise in key areas of an enterprise.
Ethics and professionalism	Skills and attitudes of how individuals uphold their professionalism in their workplace.

3.2 Phase 2: Assessing the Validity of the Questionnaire

3.2.1 Phase 2a: Face validity

The result of the quantitative analysis, which was performed by calculating the impact score for each item, displayed that none of the items were eliminated, as all items had an impact score of more than 1.5. However, a few items were required for review and modification per the panels' suggestions, mainly regarding the terms applied and grammatical errors.

3.2.2 Phase 2b: Content validity

As we continued with content analysis, 9 items had I-CVI equal to 0.67, and 38 items had I-CVI equal to 1 (Table 2). Except for the 9 items, most of the items were found to be relevant. The S-CVI/UA and S-CVI/Ave for 47 items were 0.81 and 0.94, respectively, displaying excellent content validity of the questionnaire.

Table 2
Content validity indices

Item num.	Expert in agreement	I-CVI	UA-CVI	I-CVI interpretation	Pc	Kappa statistics	Kappa statistics interpretation
1	3	1.00	1	Relevant	0.1250	1.00	Excellent
2	3	1.00	1	Relevant	0.1250	1.00	Excellent
3	3	1.00	1	Relevant	0.1250	1.00	Excellent
4	3	1.00	1	Relevant	0.1250	1.00	Excellent
5	2	0.67	0	Eliminated	0.3750	0.47	Fair
6	3	1.00	1	Relevant	0.1250	1.00	Excellent
7	3	1.00	1	Relevant	0.1250	1.00	Excellent
8	3	1.00	1	Relevant	0.1250	1.00	Excellent
9	3	1.00	1	Relevant	0.1250	1.00	Excellent
10	2	0.67	0	Eliminated	0.3750	0.47	Fair
11	3	1.00	1	Relevant	0.1250	1.00	Excellent
12	3	1.00	1	Relevant	0.1250	1.00	Excellent
13	3	1.00	1	Relevant	0.1250	1.00	Excellent
14	3	1.00	1	Relevant	0.1250	1.00	Excellent
15	3	1.00	1	Relevant	0.1250	1.00	Excellent
16	3	1.00	1	Relevant	0.1250	1.00	Excellent
17	3	1.00	1	Relevant	0.1250	1.00	Excellent
18	3	1.00	1	Relevant	0.1250	1.00	Excellent
19	3	1.00	1	Relevant	0.1250	1.00	Excellent
20	3	1.00	1	Relevant	0.1250	1.00	Excellent
21	3	1.00	1	Relevant	0.1250	1.00	Excellent
22	3	1.00	1	Relevant	0.1250	1.00	Excellent
23	3	1.00	1	Relevant	0.1250	1.00	Excellent
24	3	1.00	1	Relevant	0.1250	1.00	Excellent
25	2	0.67	0	Eliminated	0.3750	0.47	Fair
26	2	0.67	0	Eliminated	0.3750	0.47	Fair
27	3	1.00	1	Relevant	0.1250	1.00	Excellent
28	2	0.67	0	Eliminated	0.3750	0.47	Fair
29	3	1.00	1	Relevant	0.1250	1.00	Excellent
30	3	1.00	1	Relevant	0.1250	1.00	Excellent
31	2	0.67	0	Eliminated	0.3750	0.47	Fair
32	3	1.00	1	Relevant	0.1250	1.00	Excellent
33	3	1.00	1	Relevant	0.1250	1.00	Excellent
34	2	0.67	0	Eliminated	0.3750	0.47	Fair
35	3	1.00	1	Relevant	0.1250	1.00	Excellent
36	3	1.00	1	Relevant	0.1250	1.00	Excellent
37	2	0.67	0	Eliminated	0.3750	0.47	Fair
38	3	1.00	1	Relevant	0.1250	1.00	Excellent
39	3	1.00	1	Relevant	0.1250	1.00	Excellent
40	3	1.00	1	Relevant	0.1250	1.00	Excellent
41	3	1.00	1	Relevant	0.1250	1.00	Excellent
42	3	1.00	1	Relevant	0.1250	1.00	Excellent
43	3	1.00	1	Relevant	0.1250	1.00	Excellent
44	2	0.67	0	Eliminated	0.3750	0.47	Fair
45	3	1.00	1	Relevant	0.1250	1.00	Excellent
46	3	1.00	1	Relevant	0.1250	1.00	Excellent
47	3	1.00	1	Relevant	0.1250	1.00	Excellent
	S-CVI/Ave	0.94					
	S-CVI/UA		0.81				

The nine items had a Kappa value of 0.47, presenting a fair degree of agreement, while the remaining items, with a Kappa value of 1.00, presented an excellent degree of agreement. Furthermore, according to the panels' suggestions, 3 items (facilities management, facilities management audit, and space audit assessment) were added at the end of this stage. After modification, an instrument with nine dimensions and 50 items was prepared for pilot testing.

3.3 Phase 3: Pilot Testing

A total of 33 participants answered the questionnaire, with bachelor's, master and PhD holders (Table 3). Most of the participants were from the private sector and mostly provided services of maintenance of buildings, building works, development and construction management, and education. Besides, the participants were generally building surveyor professionals with entry and veteran levels of experience. Half of the participants were Members' membership under the RISM, followed by Graduates' and Fellows' membership. Meanwhile, only a few participants were with full membership of the MyRBS, either owned a BS firm or were freelancers.

Table 3
Demographic information of the respondent

Information	Frequency	Percentage (%)
Level of education		
Doctoral degree (PhD)	7	21.2
Master's degree	10	30.3
Bachelor's degree	16	48.5
Diploma	-	-
Total	33	100.0
Type of organisation		
Public sector	8	24.2
Private sector	20	60.6
Learning institution	5	15.2
Total	33	100.0
Type of service(s)		
Building control administrative	8	12.3
Development and construction management	10	15.4
Building works	13	20.0
Maintenance of buildings	21	32.3
Insurance	2	3.1
Educational	10	15.4
Other	1	1.5
Total	65	100.0
Position in the organisation		
Building manager	8	24.2
Building surveyor	12	36.4
Construction manager	-	-
Facilities manager	1	3.0
Lecturer	5	15.2
Project manager	1	3.0
Other	6	18.2
Total	33	100.0
Years of working experience		
Less than 3 years	11	33.3
3 to 6 years	2	6.1
7 to 9 years	6	18.2
10 to 12 years	5	15.2

More than 12 years	9	27.3
Total	33	100.0
Class of membership under the RISM, BS Division		
Fellow	1	3.0
Member	17	51.5
Graduate	15	45.5
Probationer	-	-
Total	33	100.0
Class of membership of the MyRBS		
Full membership (owner BS firm)	4	12.1
Full membership (freelance without BS firm)	4	12.1
Not membership	25	75.8
Total	33	100.0

3.4 Phase 4: Assessing the Reliability and Validity of the Questionnaire
3.4.1 Phase 4a: Construct validity of the questionnaire

As the total sample size collected from the pilot study was 33 respondents, based on the formula, the value for the degrees of freedom, df, is 31. Based on Pearson's correlation table for the critical value at 31 df (.05), the critical value is 0.349. Referring to the results as displayed in Table 4, the Pearson Correlation, r_{value}, the lowest value is .407 for the item "fundamental knowledge", which was considered as valid as the r_{value} > .349. therefore, none of the items were removed.

Table 4
Construct validity using the Pearson Correlation coefficient analysis

Code	Item	Correlation	Criterion
K	**Knowledge and understanding**		
K1	Fundamental knowledge		
	Pearson Correlation	.407	Valid
	Sig. (2-tailed)	.019	(r > .349, α < .05)
	N	33	
K2	Technical knowledge		
	Pearson Correlation	.446	Valid
	Sig. (2-tailed)	.009	(r > .349, α < .05)
	N	33	
K3	Conduct rules and legislation		
	Pearson Correlation	.482	Valid
	Sig. (2-tailed)	.005	(r > .349, α < .05)
	N	33	
K4	Code of practice		
	Pearson Correlation	.635	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
K5	Market philosophy and societal trends		
	Pearson Correlation	.730	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
C	**Cognitive skills**		
C1	Critical thinking		
	Pearson Correlation	.553	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
C2	Analytical thinking		
	Pearson Correlation	.681	Valid

	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
C3	Problem-solving		
	Pearson Correlation	.683	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
C4	Decision-making		
	Pearson Correlation	.738	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
C5	Conflict resolution		
	Pearson Correlation	.656	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FA	**Functional work skills (Fundamental skills)**		
FA1	Writing		
	Pearson Correlation	.442	Valid
	Sig. (2-tailed)	.010	(r > .349, α < .05)
	N	33	
FA2	Communicating		
	Pearson Correlation	.708	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FA3	Language		
	Pearson Correlation	.539	Valid
	Sig. (2-tailed)	0.001	(r > .349, α < .05)
	N	33	
FA4	Listening		
	Pearson Correlation	.818	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FA5	Numeracy		
	Pearson Correlation	.814	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FB	**Functional work skills (Core practical work skills)**		
FB1	Building inspection		
	Pearson Correlation	.661	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FB2	Building control and compliance		
	Pearson Correlation	.714	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FB3	Space planning and measurement		
	Pearson Correlation	.576	Valid
	Sig. (2-tailed)	<.0011	(r > .349, α < .05)
	N	33	
FB4	Building maintenance and refurbishment		
	Pearson Correlation	.617	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FB5	Building conservation and pathology		
	Pearson Correlation	.585	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	

FB6	Facilities management		
	Pearson Correlation	.695	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC	**Functional work skills (Optional practical work skills)**		
FC1	Building remeasurement		
	Pearson Correlation	.711	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC2	Technical due diligence		
	Pearson Correlation	.631	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC3	Digital construction		
	Pearson Correlation	.624	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC4	Building performance		
	Pearson Correlation	.610	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC5	Post-Occupancy Evaluation (POE)		
	Pearson Correlation	.695	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC6	Sustainability and green building		
	Pearson Correlation	.714	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC7	Facilities management audit		
	Pearson Correlation	.664	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FC8	Space audit assessment		
	Pearson Correlation	.602	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FD	**Functional work skills (Interpersonal skills)**		
FD1	Teamwork		
	Pearson Correlation	.770	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FD2	Negotiation		
	Pearson Correlation	.772	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FD3	Client care		
	Pearson Correlation	.754	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FD4	Leadership		
	Pearson Correlation	.631	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FD5	Mediation		
	Pearson Correlation	.822	Valid

	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FE	**Functional work skills (Management and organisational skills)**		
FE1	Time management		
	Pearson Correlation	.660	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FE2	Asset management		
	Pearson Correlation	.678	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FE3	Risk management		
	Pearson Correlation	.834	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FE4	Authority liaison management		
	Pearson Correlation	.757	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FE5	Handing over management		
	Pearson Correlation	.677	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
FE6	Building construction management		
	Pearson Correlation	.599	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P	**Personal and entrepreneurial skills**		
P1	Emotional intelligence		
	Pearson Correlation	.652	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P2	Personal management		
	Pearson Correlation	.655	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P3	Flexibility		
	Pearson Correlation	.652	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P4	Adaptability		
	Pearson Correlation	.710	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P5	Independent		
	Pearson Correlation	.554	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P6	Work under pressure		
	Pearson Correlation	.556	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
P7	Entrepreneurship		
	Pearson Correlation	.805	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	

E	**Ethics and professionalism**		
E1	Code of practice		
	Pearson Correlation	.809	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
E2	Conduct rules and legislation		
	Pearson Correlation	.772	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	
E3	Work ethics		
	Pearson Correlation	.691	Valid
	Sig. (2-tailed)	<.001	(r > .349, α < .05)
	N	33	

3.4.2 Phase 4b: Reliability of the questionnaire

Based on the value of Cronbach's alpha, which was >.9, the scale displayed that the instrument items have an excellent internal consistency and reliability.

4. Discussion

This article describes the questionnaire development process meant for identifying the critical employability skills required for building surveying graduates. The development of the employability skills framework is based on the perspective of two parties involved in the employability process of the graduates: HEIs (development of employability skills) and employers (demand for employability skills). The results of the assessment on its validity and reliability have also been reported.

Face and Content Validity

The face validity was assessed by five panels with a mix of experts for language, measurement and building surveying. As all items had an impact score of more than 1.50, these proved that all items are clear and represent the constructs. Different cases with content validity it was assessed by three panels, who are experts in the building surveying field. Although the minimum required for the experts is met, as suggested by Lynn (1986, as cited in [21]), the interpretation of the results might be affected. Initially, 9 out of 47 items were subjected to elimination as the I-CVI value was equal to 0.67, which was less than the minimum threshold of 0.78. However, the S-CVI/UA and S-CVI/Ave results displayed excellent validity of the questionnaire content. Therefore, the items were second-tested using a Kappa statistic to utilise the I-CVI with the degree of agreement [17]. The 9 items presented a fair degree of agreement with a Kappa value of 0.47 and were suggested for review and modification to avoid misinterpretation and confusion.

Construct Validity and Reliability

Refer to the previous studies, most of the construct validity was measured using either exploratory factor analysis (EFA) or confirmatory factor analysis (CFA). As the total sample size collected from the pilot study was 33 respondents, and considered a small sample size, Pearson's correlation was considered, as it can also be calculated using IBM SPSS software. The result shows that all items had the r-value of more than the critical value; thus, none were removed.

Limitations

The questionnaire had certain limitations, which concerned one expert regarding the length or number of items. It was said to be too much and certainly will impact the response rate in the main survey. However, none of the other experts had raised the concerns, and some even provided additional suggestions for items to be included.

5. Conclusion and Recommendation

This study detailed the development process of the employability skills questionnaire instrument in assessing the crucial employability skills required for building surveying graduates. It provides evidence of an adequate process for face validity, content validity, construct validity and reliability. The constructs and items of the questionnaire were improved through a 2-stage assessment. The final questionnaire encompassed 9 domains and 50 items; thus, the questionnaire serves as a robust tool to adequately explore the crucial employability skills for building surveying graduates in Malaysia.

The purpose of the instrument development was to measure the industry perspective on the crucial employability skills that are required from entry-level employees. The result produced by this instrument was useful in guiding the building surveying graduates towards the most in-demand skills by employers and industries, then increasing the chances of being employed. Besides, the categorisation of items in specific groups will be beneficial to institutions, organisations and industries by providing a benchmark in forming a building surveying standards discipline.

Instrument validation is one of the important processes in developing a new questionnaire. Through this process, it will provide an assurance that the instrument accurately measures what it is intended to measure and provides confidence in the reliability of the reported results. Beyond the use for building surveying discipline, the validated instrument can be used by other related disciplines such as property surveying, quantity surveying and land surveying with some adjustment to their particular set of skills.

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Conflict of Interest Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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