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Analyzing Generic Competency Required by Malaysian Contractors from Malaysian Construction Management Graduates using the Rasch Measurement Model

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ABSTRACT

This study aimed to investigate construction management graduates' generic skills competency required by Malaysian contractors for entry-level construction managers. This study employed a questionnaire survey, and data were collected using a 5-point Likert scale questionnaire. The instrument adopted 75 items from the Association of Project Management and the Project Management Institute generic skills competency to measure industry requirements. A total of 94 construction practitioners representing contractors (grade 5 to 7) in the Klang Valley participated in this study. The Rasch Measurement Model was used to analyse the items and respondents' reliability, the items and respondents' separation index, the items' fit, the levels of items' agreement and the respondents' ability. The findings showed that the items' reliability index was 0.83 and the respondents' reliability index was 0.96. The items' strata index was 2.18, which means that there are two different levels of item agreement in this study. Meanwhile, the respondents' strata index was 5.24, which means that there are five levels of respondents' requirement in this study. The results also found that 21 items were misfits based on the Rasch Measurement Model's values of outfit/infit MNSQ and the z-standardised index. The Rasch Measurement Model identified that most of the construction practitioners

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required construction management graduates to practise generic skill competency in performing the roles and tasks of entry-level construction managers.

Keywords: Construction management, entry-level construction managers and generic competency

INTRODUCTION

The working environment and culture of a construction project are unique compared to most other working conditions. Construction professionals work with more people from other disciplines than do most other professionals (Gould & Joyce, 2009). They must work as a team within the whole organisation, with each individual having a specific function to deliver specific sub-objectives and the performance of each is usually measured to rate the achievement of organisational goals (Mat Isa, 2007). Someone is needed to manage an organisation for it to achieve its goals.

Construction management skills involve people relationships, which is why most of the skills relate to direct human and project interrelationship. Relative to social skills, the work of site managers and contract managers stresses on the need for keeping people informed, getting them involved in tasks, fostering cooperation and teamwork, communicating clearly, dealing with people as individuals and showing an interest in people (Smallwood, 2000). Construction management is all about people (soft) skills and technical (hard) skills (Tan, 2005). However, some researchers have suggested that construction managers are lacking in managerial knowledge and skills that enable them to perform at their optimum. Moreover, graduates have been found to be lacking in communication skills (verbal and written), are unable to relate to others, do not seem to understand other employees and are not able to manage and facilitate others working in the same organisation (Love & Haynes, 2001).

Employers seek employees who are quick to learn, can adapt to change, are able to work on a range of tasks simultaneously (Harvey, Moon, Geall, & Bower, 1997) and have good oral and written communication skills. Furthermore, the industry requires employees to have the ability to work with others, be flexible and adapt to the changing working environment (United States Department of Labour, 2009). They require employees who are able to work in teams, communicate effectively, solve problems and manage themselves (Davies & Poon, 1999). Construction managers cannot achieve everything by effort alone (Love & Haynes, 2001). They often need to harness their positive skills sufficiently to get along with others and implement projects with the rest of the project team for its successful completion and to achieve set goals and objectives (Tan, 2004). The importance of generic skills for entry-level construction managers is the reason for this research, which focussed on identifying competency of generic skills of entry-level construction managers required by Malaysian contractors for performing the roles and tasks of entry-level construction managers.

Competency in Construction Management Scope

Management skills include human skills (generic skills), technical skills and conceptual skills (see Figure 1). Figure 1 shows that competency in generic skills covers more than 50% of the competency required in management.

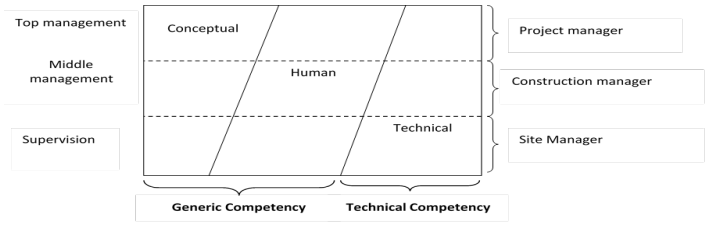

Figure 1. Management skills

Technical skills are proficiencies in a specific kind of activity, particularly one involving methods, processes, procedures or techniques (Rose, 1988). Technical skills are the ability to apply techniques and procedures. Mat Isa (2007) stated that technical skills are more structured and can be learnt through education, training and practice. Conceptual skills are the ability to think and to conceptualise abstract and complex situations (Stephen & Mary, 2009). Rose (1988) further stressed that it is evident that conceptual skills development impacts the future direction and tone of an organisation and involves the ability to see the enterprise as a whole as the various functions of an organisation depend on one another.

In the classical view, Katz (1974) identified human skills as building cooperation within a team. They involve working with attitudes and communication, individual and group interest, in short working with people. However, the contemporary view believes that human skills are people-related activities, which are management's effort aimed at managing people in the organisation. Such activities include providing support and encouragement to others, providing recognition for achievement and contribution, developing skills and confidence of organisation members, consulting when making decisions and empowering others to solve problems (Certo & Certo, 2009). Human skills reflect the ability to work effectively as a group member and to build cooperative effort (Rose, 1988).

In the past, most contractors were focussed on technical and conceptual skills in hiring their construction managers (Bridgstock, 2011). However, nowadays, technical and conceptual skills are not enough to qualify a construction worker, who must face the needs of a global industry that is advanced, powerful and forward moving. Badawy (1995) suggested that the criteria

for successful managers must not depend on the managers' traits and characteristics but rather on their competency in performing their job. Therefore, it is important for construction management students to improve their competency skills and gain competency during their studies.

The Rasch Measurement Model

The aim of this study was to investigate construction management graduates' generic competency as required by Malaysian contractors for performing the roles and tasks of entry-level construction managers. This research employed a Rasch Measurement Model specifically designed for survey rating scales, namely the Rasch Rating Scale Model (Andrich, 1978). This model is appropriate for Likert-scale data because it relates the measure of a person's latent trait (e.g. one's tendency to agree with a statement) to the probability of an item response on a single scale. It is only when these two elements are placed on the same scale and compared that truly meaningful inferences about persons and interactions can be made.

The Rasch Measurement Model is able to identify items on interval scale and enhances one's capability to understand a construct and recognise potential inadequacies in a given scale (Green, 1996). When the principal responds to items, he or she indicates his or her level of satisfaction using an ordinal rating scale. The Rasch Rating Scale Model converts these raw ordinal data responses to their natural logarithm, thereby producing interval level measures or logits (Aziz, 2010). Similar to a ruler, which uses units like inches to represent equidistant interval units of measure, item maps use logits. Furthermore, the Rasch Measurement Model analysis utilises the Winsteps measurement software to test data-to-model fit (dimensionality) and data measure quality (item fit) and illustrates the construct hierarchy by way of item maps.

METHODOLOGY

This research used the survey as research design. The target population of this study included G5 to G7 contractors in Malaysia. This research employed the cluster sampling technique. The population of this research was 2,679 contractors of Grade 5 to 7 in the Klang Valley, registered with the Construction Industry Development Board [CIDB] Malaysia. This group was chosen for this research due to their establishment and because most of them employed construction management graduates, unlike contractors of Grade 1 to 4. Ninety-four respondents were randomly selected from the various construction practitioners. They were construction managers and individuals who worked with entry-level construction managers, and therefore, were believed to be able to assess entry-level construction managers).

This research adopted the 360˚ survey as a research instrument. This research used an instrument that included 11 constructs that consisted of 75 items. The constructs were:

1. Communication
2. Behavioural characteristics
3. Conflict management
4. Teamwork and cooperation
5. Analytical thinking
6. Critical thinking
7. Flexibility
8. Team leadership
9. Ethics
10. Negotiation
11. Relationship building

The reason for adopting the 360° survey in this research was that construction projects are unique in nature. Construction projects vary from one another. They are different in project procurement and project type. Moreover, the job specification of construction managers is very general. Many claim to be construction managers (Project Management Institute, 2004), including architects and quantity surveyors.

RESULTS AND DISCUSSION

The summary statistics tables show that the Cronbach Alpha value was 0.96, which is acceptable, indicating test reliability in measuring the generic skills competency required by Malaysian contractors for construction management graduates. Table 1 shows that item reliability was 0.83, which means that there were a sufficient number of items to measure for an accurate reading. The instrument could reliably separate person perception. Person reliability was 0.96, indicating that 96% of the result would be repeated if the same respondents were answering questions tied to alternative instruments measuring generic skills competency (Aziz, 2011).

For an instrument to be useful, separation should exceed 2.0, with higher values of separation representing the greater spread of items and persons along a continuum. If the statistically distinct levels of item difficulty are defined as difficulty strata with centres three calibration errors apart, then this separation index G can be translated into the number of item strata defined by the test H and similarly for persons (Wright & Master, 1982). The number of person strata was 5.24, indicating that the contractor and construction practitioner could be separated into five requirement groups. The number of item strata was 2.18, indicating that the requirement level could be separated into two important levels. Thus, the sample of 94 construction practitioners could be separated into five levels of requirement, and the 75 items in the soft skills development model could be separated into two levels of importance.

Table 1
Reliability of the instrument (measured: 94 persons)

	Total Score	Count	Measure	Model Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	266.5	71.2	-6.31	0.20	1.81	1.8	1.80	2.4
S.D.	62.5	11.9	1.52	0.13	1.95	3.4	1.55	3.1
Max.	373.0	75.0-	0.85	1.34	9.90	9.9	9.90	9.9
Min.	3.0	1.0	-9.29	0.08	0.28	-6.9	0.28	-4.2

REAL RMSE 0.29 TRUE SD 1.49 SEPARATION 5.24 PERSON RELIABILITY 0.96
MODEL RMSE 0.24 TRUE SD 1.50 SEPARATION 6.28 PERSON RELIABILITY 0.98
S.E. OF PERSON MEAN = 0.17

Measured: 75 Item

	Total Score	Count	Measure	Model Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	305.6	81.7	0.00	0.17	1.69	2.0	1.81	1.8 |
S.D.	14.4	2.5	0.48	0.01	1.67	1.3	1.56	2.2 |
Max.	337.0	85.0	0.65	0.18	9.90	6.1	9.90	9.9 |
Min.	258.0	70.0	-2.18	0.08	0.87	-0.8	0.88	-0.3

REAL RMSE 0.20 TRUE SD 0.44 SEPARATION 2.18 ITEM RELIABILITY 0.83
MODEL RMSE 0.17 TRUE SD 0.46 SEPARATION 2.75 ITEM RELIABILITY 0.88
S.E. OF ITEM MEAN = 0.06

Item Polarity and Item Measure Quality

This study referred to the common logit scale as this was the same scale that was used in measuring both person ability and item difficulty. Therefore, it compared both variables on the same interval scale. The logitmax was "Applies complex concepts" (e.g. root-cause analysis, portfolio analysis, natural selection) or "Applies knowledge of past discrepancies, trends and relationships to look at different situations "(CT8.2). Moreover, the logitmin, "Communicates decisions and the reasons for decisions to team members. Encourages top-down and bottom-up communication from all members of the project team" (C2.6), where located, was δ=2.83. This indicated that the item difficulty of the item was spread over 2.83 logit units against the person, measuring 10.14 logits unit.

The quality of the item was determined by the attributes' Point Measure Correlation (PMC); the PMC value must be within the acceptable parameter, which is x, $0.4<x<0.8$. Table 2 shows only one item with PMC below 0.4 (C2.1, 0.38) and one item with negative Point Measure Correlation (C2.6,-.04). This negative value shows the relationship for response item i.e. the respondents contradicted the variable or the construct (Linacre, 2006). These two items were rejected because they did not measure any constructs. Table 2 also showed a small measurement error mean of SE +0.17 logit.

Further verification was done by looking at the outfit column for the Mean Square value; MNSQ=0.5<*y*<1.5. Outfit statistics are sensitive to unexpected behaviour on items. It is more sensitive in responding to items of greater difficulty and vice versa (Aziz, 2010). Table 2 shows that 19 items were out of the MNSQ, and the z-std range was rejected. Table 2 shows that the item (PS4.7), "Knows when to escalate or engage others when conflicts cannot be resolved," was a misfit, with MNSQ 1.53 logit with z-std still in range. Item (TW6.6), "Asks for support and offers assistance as appropriate," had 0.05 logit more than 1.50 logit with z-std still in range. Therefore, these two items, PS4.7 and TW6.6, were counted as fit due to the z-std>+/-2.0.

Analysis of items from the same dimension having the same measure showed items (CT8.3), "Applies or modifies complex learned concepts or methods appropriately," and (CT8.1), "Observes discrepancies, trends and interrelationships in data, or sees crucial differences between the current situation and past situations," at 0.38 logit. Moreover, (N12.2), "Decides on the desired outcome and minimum acceptable position, recognising the extent of own remits and the point at which escalation may become necessary. Distinguishes between negotiating a position and real underlying need," and (N12.6), "Considers practical options and prioritises those presenting the optimal solution for the project," at 0.26 logit. (AT7.2), "Sets priorities for activities in order of importance," and (AT7.4), "Understands how actions taken on the project may impact other areas of the project, other projects in the organisation or other organisational operations," at 0.08 logit. (RB10.1), "Maintains formal working relationships; most contacts are work-related largely confined to work-related matters but not necessarily formal in tone, style or structure," and (RB10.3), "Maintains a network of relationships, which extends through all levels of the work unit or project team," at 0.03 logit. This same measure was observed when respondents saw the items as measuring the same thing. An item whose MNSQ was closer to 1 and z-std closer to 0 was deemed a better fit. Thus, items (CT8.1), (N12.6), (AT7.4) and (RB10.3) should be maintained while items (CT8.3), (N12.2), (AT7.2) and (RB10.1) should be deleted or rephrased to preserve content validity.

Table 2
Item polarity and item measure quality

Entry Mode	Total Score	Total Count	Measure	Model S.F.	Infit		Outfit		PT-Measure		Exact Match		Displace	Item
					MNSQ	ZSTD	MNSQ	ZSTD	Corr.	Ext.	OBS %	Exp &%		
45	281	82	.65	.16	1.14	.9	1.17	.8	.68	.62	56.1	52.5	.60	CT8.2
54	281	81	.57	.16	1.90	4.4	1.82	2.8	.55	.62	54.3	52.6	.60	RB10.2
1	258	74	.56	.17	1.72	3.5	6.30	9.7	.38	.61	50.0	52.6	.60	C2.1
17	290	83	.54	.16	1.45	2.5	2.48	4.4	.52	.61	47.0	52.9	.60	BC3.1
6	286	80	.38	.16	1.29	1.7	1.31	1.2	.66	.60	53.8	54.0	.60	N12.1
44	293	82	.38	.16	1.33	1.9	1.34	1.3	.64	.60	59.8	53.9	.60	CT8.1
46	293	82	.38	.16	1.42	2.3	1.39	1.4	.68	.60	61.0	53.9	.60	CT8.3
4	281	78	.34	.17	1.60	3.1	1.70	2.2	.49	.59	48.7	53.5	.60	C2.4
70	295	82	.33	.16	1.34	1.9	1.40	1.4	.63	.60	47.6	54.0	.60	N12.4
66	293	81	.31	.16	1.49	2.7	1.76	2.4	.60	.60	56.8	54.2	.60	TL11.10
68	298	82	.26	.16	1.23	1.4	1.26	1.0	.65	.59	53.7	54.3	.60	N12.2
72	298	82	.26	.16	1.14	.9	1.21	.8	.66	.59	48.8	54.3	.60	N12.6
19	307	84	.25	.16	1.12	.8|	1.07	.3	.68	.60	59.5	54.4	.60	PS4.1
49	295	81	.25	.17	1.44	2.4	1.35	1.3	.63	.60	51.9	54.5	.60	E9.2
3	285	78	.24	.17	1.51	2.7	1.49	1.6	.54	.58	50.0	54.0	.60	C2.3
15	300	82	.23	.16	1.38	2.1	2.68	4.4	.58	.60	52.4	54.5	.60	BC3.9
22	308	84	.23	.16	1.19	1.1	1.16	.7	.70	.5	61.9	54.6	.60	PS4.4
47	300	82	.22	.16	1.27	1.6	1.22	.8	.66	.59	56.1	54.7	.60	CT8.4
51	297	81	.20	.17	1.41	2.3	2.75	4.4	.61	.60	53.1	54.7	.60	E9.4
26	305	83	.20	.16	1.31	1.8	1.34	1.2	.61	.59	65.1	54.6	.60	FX5.1
38	305	83	.20	.16	1.34	2.0	1.24	.9	.67	.59	48.2	54.6	.60	TW6.9
50	298	81	.18	.17	1.50	2.7	1.42	1.4	.62	.59	48.1	54.7	.60	E9.3
58	302	82	.17	.17	1.10	.7	1.09	.4	.69	.59	61.0	54.8	.60	TL11.2
2	270	73	.16	.18	1.71	3.5	1.83	2.3	.45	.58	49.3	54.5	.60	C2.2
52	299	81	.15	.17	1.68	3.5	1.60	1.9	.58	.59	51.9	55.0	.60	E9.5
25	307	83	.15	.17	1.66	3.4	1.53	1.7	.68	.59	57.8	54.9	.60	PS4.7
32	307	83	.15	.17	1.82	4.1	1.73	2.3	.59	.59	48.2	54.9	.60	TW6.3
39	307	83	.15	.17	1.09	.6	1.09	.4	.68	.59	56.6	54.9	.60	AT7.1
33	304	82	.14	.17	1.48	2.6	1.36	1.2	.65	.59	56.1	55.0	.60	TW6.4
5	283	76	.12	.17	1.64	3.3	1.79	2.2	.48	.58	48.7	54.6	.60	C2.5
63	304	82	.12	.17	1.08	.5	1.06	.3	.70	.59	63.4	55.0	.60	TL11.7
73	304	82	.12	.17	1.25	1.5	1.34	1.2	.64	.59	61.0	54.8	.60	N12.7
43	309	83	.10	.17	1.07	.5	1.05	.3	.68	.59	60.2	55.0	.60	AT7.5
65	305	82	.10	.17	.90	-.6	.88	-.3	.71	.59	59.8	55.1	.60	TL11.9
9	315	84	.10	.17	1.42	2.4	1.42	1.4	.53	.58	50.0	55.0	.60	BC3.3
69	305	82	.09	.17	1.3	1.8	1.37	1.2	.66	.58	59.8	54.9	.60	N12.3
64	303	81	.08	.17	.93	-.4	.91	-.2	.74	.58	58.0	55.2	.60	TL11.8

Table 2 *(continue)*

10	315	84	.08	.17	1.42	2.3	1.37	1.3	.56	.58	50.0	55.2	.60	BC3.4
40	307	82	.08	.17	.88	-.7	.88	-.3	.72	.58	53.7	55.1	.60	AT7.2
24	310	83	.08	.17	1.09	.6	.99	.1	.72	.58	59.0	55.0	.60	PS4.6
42	310	83	.08	.17	1.04	.3	1.04	.2	.72	.58	55.4	55.0	.60	AT7.4
12	319	85	.06	.17	1.80	4.1	3.28	5.3	.48	.58	43.5	55.1	.60	BC3.6
21	292	78	.05	.17	1.28	1.6	1.14	.5	.72	.59	62.8	55.2	.6	PS4.3
71	307	82	.04	.17	1.43	2.4	1.47	1.5	.66	.58	57.3	55.0	.60	N12.5
53	304	81	.03	.17	1.51	2.7	1.34	1.1	.62	.58	61.7	55.2	.60	RB10.1
55	304	81	.03	.17	1.43	2.3	1.28	1.0	.65	.58	53.1	55.2	.60	RB10.3
16	312	83	.03	.17	1.35	2.0	1.30	1.0	.57	.58	49.4	55.1	.60	BC3.10
74	308	82	.02	.17	1.32	1.8	1.38	1.3	.64	.58	58.5	55.0	.60|	N12.8
36	309	82	.01	.17	1.31	1.8	1.22	.8	.65	.58	59.8	55.2	.60	TW6.7
57	309	82	.00	.17	1.27	1.6	1.20	.7	.64	.58	61.0	55.3	.60	TL11.1
75	309	82	-.01	.17	1.87	4.3	1.85	2.4	.58	.58	54.9	55.0	.60	N12.9
41	302	80	-.01	.17	.97	-.1	.99	.1	.68	.58	61.3	55.0	.60	AT7.3
29	314	83	-.02	.17	1.30	1.7	1.26	9	.65	.58	56.6	55.1	.60	FX5.4
61	310	82	-.03	.17|	.98	-.1	.93	-.1	.73	.58	58.5	55.5	.60	TL11.5
48	307	81	-.04	.17	1.30	1.7	1.18	.7	.68	.58	58.0	55.5	.60	E9.1
56	307	81	-.04	.17	1.47	2.5	1.37	1.2	.66	.58	50.6	55.5	.60	RB10.4
27	315	83	-.05	.17	1.07	.5	1.14	.6	.68	.58	56.6	55.4	.60	FX5.2
59	311	82	-.05	.17	1.23	1.4	1.19	.7	.67	.58	57.3	55.5	.60	TL11.3
11	320	84	-.05	.17	1.40	2.2	3.26	5.0	.50	.58	54.8	55.4	.60	BC3.5
13	322	84	-.11	.17	1.95	4.7	3.61	5.4	.56	.57	46.4	55.8	.60	BC3.7
34	318	83	-.12	.17	1.46	2.5	1.34	1.1	.67	.57	59.0	55.9	.60	TW6.5
37	319	83	-.14	.17	1.09	.6	1.03	.2	.68	.57	57.8	56.1	.60	TW6.8
31	320	83	-.17	.17	1.57	3.1	1.39	1.2	.66	.5	53.0	56.2	.60	TW6.2
30	321	83	-.20	.17	1.39	2.2	1.32	1.0	.62	.5	61.4	56.3	.60	TW6.1
62	317	82	-.20	.17	.87	-.8	.88	-.3	.70	.57	56.1	56.3	.60	TL11.6
60	318	82	-.23	.17	1.06	.4	.97	.0	.71	.57	53.7	56.4	.60	TL11.4
35	323	83	-.25	.17	1.58	3.1	1.55	1.6	.60	.56	43.4	56.5	.60	TW6.6
28	324	83	-.27	.17	1.27	1.6	1.40	1.2	.61	.56	53.0	56.9	.60	FX5.3
8	328	84	-.27	.17	1.35	2.0	1.35	1.1	.50	.56	46.4	56.6	.60	BC3.2
7	333	85	-.28	.17	1.64	3.4	3.85	5.4	.44	.56	49.4	57.0	.60	BC3.1
23	326	83	-.28	.18	1.27	1.6	1.14	.5	.70	.56	54.2	57.2	.60	PS4.5
20	327	83	-.33	.18	1.41	2.3	1.28	.9	.65	.56	50.6	57.8	.60	PS4.2
18	281	70	-2.12	.08	9.60	2.9	6.55	7.8	.57	.64	37.1	75.3	1.62	BC3.12
14	332	83	-2.15	.09	9.90	3.8|	8.20	9.9	.51	.70	26.5	72.8	1.49	BC3.8
6	337	78	-2.18	.12	9.90	6.1	|9.90	9.9	-.04	.73	28.2	73.1	1.16	C2.6
Mean	305.6	81.7	.00	.17	1.69	2.0	1.81	1.81			53.8	55.8		
S.D.	14.4	2.5	.48	.01	1.67	1.2	1.56	2.21			7.0	3.8		

Person-Item Map

Figure 2 shows the Wright Map (person-item distribution map), where the person (contractor or construction practitioner) is plotted on the left and the item (generic skill competency by APM and PMI) is plotted on the right of the logit ruler. This allows both person's ability and item difficulty to be measured and placed on the same logit ruler. The Wright Map shows high item difficulty as low level of agreement with the item, meaning that the items at the top of the scale are harder to agree with, while items at the bottom of the scale are easier to agree with. Persons at the top of the scale were in closer agreement with the items in the questionnaire, while persons at the bottom of the scale were less in agreement with the easiest or common generic skill competency requirement.

The item map (see Figure 2) shows the hierarchy on the generic skill competency for construction management graduates as required by contractors. From 75 elements of generic skill competency identified, only 32 were required by Malaysian contractors for construction management graduates. In this research, elements ranked from logit 0 and below were accepted as required by the contractors. This rank was due to the item separation value (2.28 logit), which identified two important points of agreement marked by the respondents. Therefore, a negative logit was counted as important and a positive logit as not important.

Figure 2 shows that the person with the most high requirement on the generic skill competency measured -0.85 logit. The person with the least soft skill required from construction management graduates measured -9.29. The difference between Maxperson and Minperson was 10.14 logit. Item CT8.2, "Applies complex concepts (e.g. root-cause analysis, portfolio analysis, natural selection) or applies knowledge of past discrepancies, trends, and relationships to look at different situations," seemed to be the item most difficult to agree with as being important, while item (PS4.2), "Listens to and respects the views and questions of others," was the item that was most easily agreed with as being important. Eight constructs with 28 items, as shown below, were rated by the majority of the respondents as being important:

1. Negotiation (2 items)
2. Problem-solving (4 items)
3. Relationship building (2 items)
4. Team leadership (8 items)
5. Analytical thinking (1 item)
6. Entrepreneurship (1 item)
7. Flexibility (3 items)
8. Teamwork (6 items)
9. Behavioural characteristics (1 item)

The Wright Map shown in Figure 2 shows that G-1 was an item-free person because of the different psychometric, which indicates

homogeneity despite the differences in the generic skill competency requirement. It can be concluded that the person who fell under the G-1 category was someone who thought that generic skill competency by APM and PMI was not important or was not required in performing the roles and tasks of entry-level construction managers.

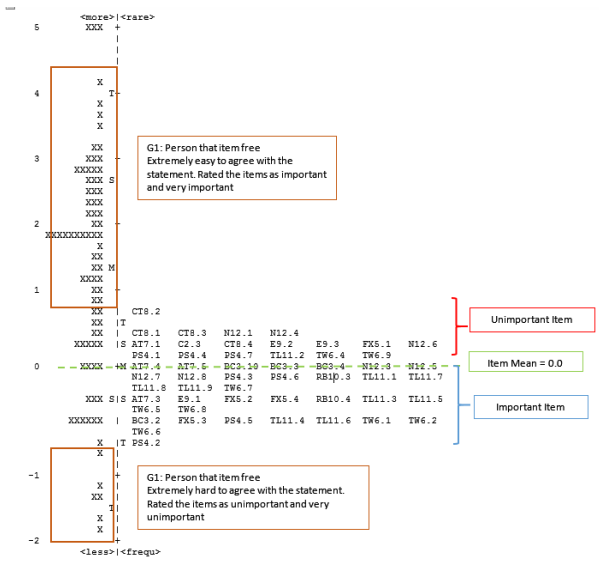

Figure 2. Person-item map (hierarchy) on generic skill competency from APM and PMI required by contractors

CONCLUSION

This study showed that the Rasch Measurement Model provided a suitable platform for measuring the requirement of construction practitioners for construction management graduates. Thirty-two generic skill competencies listed by APM and PMI were required by contractors from construction management graduates. This analysis will help students to identify the important generic competencies required by the industry so that they can build up their generic competency from the beginning of their studies.

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