Psychometric Assessment of Young Visitors at the National Museum Of Malaysia

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Abstract: Museums have become an important institution for learning activities especially for young visitors as it provides significant function towards educational benefits and knowledge enrichment. The actual outcomes from learning experience need to be encountered in order to indicate satisfying experience level from museum visiting. However, the assessment of satisfying experience on museum visit is entirely lacking in the existing literatures. Therefore, this study proposes a set of assessment for young visitors in order to evaluate their satisfying experiences in museum. The items were adapted and developed from the concept of satisfying experiences established by museum practitioners. This paper aims to present evidence in order to show the validity of the survey data and the instrument meets the requirements of specific measurements as determined by Rasch model. It is hoped that the assessment of satisfying experience will benefit researchers as well as practitioners and educators in managing the quality of young visitors experience in museum. The literature also intends to add to the body of knowledge in museum context.

Keywords: Learning, Museum, Rasch model, Satisfying experiences, Young visitors

1. Introduction

Without a doubt, museum is a treasured source of cultural, historical, scientific, and aesthetic information for the public. The International Council of Museums (2017), one of the associations under UNESCO, defines museum as a non-profit and permanent institution serving the public and its growth. Generally, museums are open to the society who procures, preserves, investigates, imparts, and displays the tangible and intangible legacy of humankind and its surroundings for educational and entertainment purposes. Generally, museum researchers or visitors concentrate on the educational role of museums and the learning outcome of museum visits while disregarding another significant angle which is the museum experience..

Amidst the present cultural development and social change, the National Museum of Malaysia remains as the archives for custom and legacy (Harris, 2006) which presents the actual structure as it seemed to be, and offers an experience to its visitors by uniting significant data out of the nation's past.

Consequently, visitor experience studies fill in as the critical component for museums, particularly regarding its policy analysis and managerial implications.

With regards to its functions, there has been a growing concern in emphasizing on young visitors' museum experience. This depends on their perception where they commonly discover that museums hold nothing of their interest and this causes them to depict museums as something unexciting, didactic, inaccessible, and defensive (Rider and Illingworth, 1997; Stuedahl and Smørdal, 2011). Based on these insights, in this present study, experience is regarded as an attitude (Doering, 1999). The proposed assessment scale will likewise add to literature by extending the comprehension of museum experience and giving the idea for future investigations in supporting the proof on the assessment for policymakers and practitioners of museum administration.

2. Literature Review

Of late, the need of understanding museum visitors and being more receptive to their inclinations have gotten much more observable. In relation to this, museums have attempted to draw in and turn out to be more receptive to the interest of a wide range of visitors, yet it is still insufficient to draw the attention and interest of young visitors. As previously mentioned in literature, it is almost impossible to fulfil the expectation and needs of all museum visitors as every individual has their own subjective and individual dimension (Packer and Ballantyne, 2016). In addition, the younger generations likewise have various convictions and behaviours as they are overwhelmed with new innovations as opposed to historical materials. As the elements of museums are getting a lot more extensive than they were before, a few authors have additionally recommended that museums need to discover new ideas to stir the interest of young visitors (Bodnár, 2019).

A more thorough clarification is shown in Garner, Kaplan, and Pugh's (2016) study which explained the concern in emphasizing young museum visitors. As young visitors are confronting issues to incorporate the current knowledge with past information, or effectively look for new information from artefacts or displays in the museums, they additionally need to adjust themselves into comprehending the museum curator's points of view and the substance of the presentation going from pictures, text, original artefacts, relics, glass boxes, and others. Henceforth, museums need to make an innovative learning which encompasses the pleasure and fun components as engaging techniques to draw better museum experiences among young visitors (Iskandar Hasan, Mohd Masdi, Emilia, and Mohd Ridhuan Tee, 2016). A few authors have likewise recommended that co-design meetings identified with interactive technologies can advance these young visitors' experience (Cesário, Matos, Radeta, and Nisi (2017).

Table 1: Learning in a Museum *(adapted from Gammon, 2001)*

Domain	Interpretation
Affective	Acknowledge contributions of others. Changes in perspectives and qualities; expand the comprehension of others' view-points
Cognitive	Effectively look for new information and build meanings from new and earlier information; incorporate new information into existing schemata; ready to put earlier information into setting;
Developing skills	Mental skills including reasoning, deduction, problem solving, decision making, and so forth, and physical skills, for example, experimentation with the exhibits, the utilization of technologies, and so on.
Personal	Changes in motivational elements of learning, self- improvement, inspired, curiosity, sense of wonder, etc.
Social	Social skill advancement through different practices.

There are various studies conducted to explore learning in museum settings. Fundamental contributions have been made by Gammon (2001) where learning in museums is grouped into five principle components: cognitive, affective, social, skills development, and personal (Table 1 shows the detailed clarifications of every component). In his argument, learning in museums is not simply the

obtaining of new information yet 'educational experience' that could fall under one of the five components. He further extended 'educational experience' in museums to incorporate communication with an item, utilizing intuitive guided tours, visits to the exhibitions, or by just going to an occasion in a museum.

In the interim, Pekarik, Doering, and Karns (1999) built up an empirical list of "satisfying experiences" that people look for and commonly encounter in museums. They classified these experiences into four classifications as follows:

i. *Object experiences* which centre around something outside the visitors, and incorporate seeing "the real thing", seeing uncommon or important items, and being moved by its attractiveness.
ii. *Cognitive experiences* which centre around the interpretive or scholarly parts of the experience, and incorporate picking up data or information, or improving comprehension.
iii. *Introspective experiences* which centre around personal emotions and experiences, for example, envisioning, reflecting, thinking back, and interfacing.
iv. *Social experiences* which centre around collaborations with peers, family, other visitors or museum staff.

Relevant literatures demonstrate that few research have been carried out with regard to the context of learning in museums. Packer and Ballantyne (2016), Bodnár (2019), Garner, Kaplan and Pugh (2016), Iskandar Hasan, Mohd Masdi, Emilia, and Mohd Ridhuan Tee (2016), and Cesário, Matos, Radeta, and Nisi (2017) investigated the needs of developing engaging techniques for young museum visitors which focus more on the entertaining and fun learning style approaches (Aziz, et al., 2020) . It is accepted that this sort of strategy would have the option to improve the degree of satisfying experience among young museum visitors. A characterization of learning in museums (Gammon, 2001) likewise made a fundamental contribution towards picking up a more profound understanding on having educational experience to young museum visitors. It is likewise upheld by Pekarik, Doering, and Karns (1999) which have built up an empirical list of satisfying experiences that visitors look for and commonly encounter in museums.

2.1 Motivation, Satisfying Experiences, and Generic Learning Outcomes

Motivation is a perplexing theme that includes understanding intrinsic and extrinsic motivation. Intrinsic motivation is portrayed by something that is innately fascinating or pleasant, while extrinsic motivation is because of an external power or self-regulation that prompts a divisible result (Ryan and Deci, 2000).

Ryan and Deci (2000) further highlighted that motivation is the point at which an individual is moved to accomplish something and can change their dependent on level and direction, which concerns underlying attitudes and objectives that offer ascent to activity that is, the why of activities.

Rowe and Nickels (2011) claimed that that each visitor that goes to the museum with a combination of motivation, for example, wanting to discover some new information, a social communication, or have a relaxing experience, however certain motivations are more significant relying upon the setting of the visit. Rowe and Nickels (2011) portrayed that motivation is an underlying assumption which has been communicated during a visit will straightforwardly affect how visitors lead their visit and what implications they will make from the experience. Halif et al. (2020) mentioned where motivation is important towards engagement during learning process. Anderson and Ellenbogen (2012) emphasized that motivation, alongside with physical environment, social context, and personal interest, is one factor that can impact how a museum visit will affect a visitor's experience and learning.

Then, satisfying experiences in museums can possibly impact visitors' learning as well as their overall well-being in a long haul. Pekarik et al. (1999) established a satisfying experience framework which incorporates four sorts of significant museum visitors' experiences namely cognitive experiences, introspective experiences, and social experiences.

In relation to this, Doering (1999) proposed that museums should configure spaces to explicitly evoke these four experiences as they produce advantageous results for the visitors (Packer, 2008). These four types of satisfying experiences are additionally subject to encountering different good feelings, for example, encountering magnificence, feeling a feeling of connectedness, or reviewing memories

(Doering, 1999; Pekarik et al., 1999). The presence of positive feelings inside these four satisfying experiences fortifies their effects on museum visitors' learning.

Along these lines, making an all-around oversaw customer experience gives museums a competitive edge (Dirsehan and Yalçin, 2011). Asquith (2012) claimed that by making an in general experience, a museum can pull in guests, ensure repeating visits, and hold guests' consideration in exhibit components. Guaranteeing that visitors are having positive social interactions improves the probability of a positive general experience.

Furthermore, materials that possess intrinsic value to visitors according to their very own associations and capacity will create a valuable experience (Veverka, 2011). Drawing in with an exhibit can make a positive experience and guests may review wonderful memories to interpret an exhibit (Afonso and Gilbert, 2007). In addition, interactive exhibits encourage hands on encounters (Afonso and Gilbert, 2007) which permit guests to attempt new things, be outstanding at something, or partake in a satisfying experience (McGonigal, 2009).

According to Falk et al. (1992), museum experience, also called visitor experience, has for quite a long while been both a pertinent and multifaceted research subject. Given that one of the fundamental explanations behind visiting museums is to find and get new information (Packer and Ballantyne 2002), subsequently, their study centres around visitors' learning experience. In this circumstance, it should be noticed that learning in museums is unique (Isa and Zakaria, 2007), voluntary, free, and guided by the guests' own decisions.

A few authors including Gammon (2003) and Hooper-Greenhill et al. (2004) have proposed models which empower visitors' learning experience to be evaluated. In the present study, a model inspired by the GLO (Generic Learning Outcomes) formulated by Hooper-Greenhill et al. (2004) is emphasized. In addition, this model, as per the work introduced in Bationo Tillon, Marchal, and Houlier (2011), features two dimensions: analytic and sensitive. These dimensions structure visitors' experience which result from contact with the exhibits. GLO was executed by the UK's Ministry of Museums, Libraries, and Archives (MLA). Today, it is broadly utilized by a few UK museums (Graham, Mason, and Nayling, 2013) and is effectively applied by the mediation administrations of the MLA. As indicated by Hooper-Greenhill et al. (2004), the GLO model perceives learning as an experience whose results include: expanded knowledge and understanding, extra skills, an adjustment in qualities and perspectives, sensations of delight, motivation and imagination, and an incitement to actions and progression.

Since the research works in museology that were carried out by Pekarik, Doering, and Karns (1999), Kotler (1999), and Packer and Ballantyne (2002) have recognized a few kinds of visitor experience, this present study centres around a specific visitor experience: the learning experience. In reality, learning experience is considered by the authors of thosee articles as one of the most post-experiences in museums, to be specific, the Generic Learning Outcomes. To the best of the researchers' knowledge, there is no published work on the evaluation of motivation, satisfying experiences, and generic learning outcomes with regards to learning in museums; notwithstanding there have been numerous interactive exhibitions in museums that have begun to show up in recent years. This circumstance has driven us to develop a research framework as shown in Figure 1:

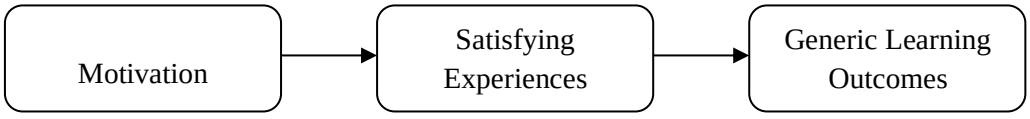


Fig. 1 Research Framework (developed by the authors for the current study)

3. Methodology

The instrument consists of 23 developed and adapted items from the concept of satisfying experiences as shown in Table 2. Five-point Likert scale is adapted to rate the items of experience

quality (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree), to make it suitable for young visitors to answer the survey. The respondents of this study were young visitors which represented by school students visited National Museum of Malaysia. As a result, 334 out of 368 sets of questionnaire were completely returned yielded response rate of 90.76%.

Under this research, the computer package Bond&Fox Steps was used to analyze the young visitors' response on experience quality items and to apply Rasch Rating Scale Model to the data (Mahphoth, 2017). According to Ramakrishnan, Jaafar, Yatim and Mamat (2013), a Rasch analysis is a procedure to assess the quality of raw score data using the Rasch model criteria namely fit statistics, z-standard residuals and point-measure correlations. Through Rasch Model, each person with a certain amount of a given latent trait specifies the probability of a response in one of the categories of an item (Bond and Fox, 2015).

Furthermore, in Rasch analysis, the relationship between the observable variables and the underlying construct expressed as measurement model (Bond and Fox, 2015). Rasch measurement will identify two important parameter; 1) test item difficulty and 2) person ability. It is represented in a logit scale. Therefore, it assumes that items responses are unidimensional and locally independent. Rasch measurement for satisfying experiences brings an opportunity to understand young visitors' experiences in National Museum of Malaysia.

Table 2: Scale of Young Visitors' Satisfying Experiences at National Museum of Malaysia

Construct	Items
Social Experiences	
Social_1	I talk to my friend about our visit to the museum.
Social_2	I am very excited to join my friends for the trip to the museum.
Social_3	The officer is very helpful and nice to our group during the trip.
Social_4	There is a docent that assists our visit inside the museum.
Social_5	I asked the docent when I have queries on the exhibition.
Social_6	I asked my teacher when I have queries on the exhibition.
Sensory Experiences	
Sensory_1	I can see the real historical artefacts in the museum.
Sensory_2	I can touch most of the real artefacts in the museum.
Sensory_3	I am very impressed with the use of multimedia in the museum.
Sensory_4	There is a lot of information kiosk that provide useful information about the museum.
Sensory_5	I experienced some of the physical object inside the museum.
Sensory_6	I spent time for a live performance during the museum visit.
Cognitive-Affective Experiences	
Cognitive_1	The artefact that shown in the museum is consistent with what I learnt in school.
Cognitive_2	I spend a longer time in an interactive exhibition corner inside the museum.
Cognitive_3	I saw strange things inside the museum.
Cognitive_4	I can identify the museum objects and relate them with the lesson that I learnt in school.
Affective_1R	Museum is such a boring place to me. (R)
Affective_2R	In my opinion, museum is a bit gloomy. (R)
Affective_3	I am passionate to the artefacts inside the museum.
Affective_4	I enjoyed the hands-on session provided by the museum curator.
Introspective Experiences	
Introspective_1	I appreciate with the value of history restored in the museum.
Introspective_2	I feel honored when I visited Malaysian museum.
Introspective_3	Museum is a heritage place that needs to be conserved for future generation.

4. Findings

The analysis was conducted to identify how well each item fits within the underlying construct in the young visitors' satisfying experiences scale. Figure 1 shows the Person-Item Distribution Map

(PIDM), where the person is the young visitors whilst the item is the question of the instrument (survey). PIDM is a diagram of two variables that are plotted on the same logit scale ruler. By virtue of the same scale, the relationship of person ability and item difficulty can now be established. PIDM shows the logit scale of person on the left side of the dashed line where distribution of young visitors ability from poor to most able young visitors is from bottom to top. For logit scale of item, on the right side of the dashed line distributed from bottom to top represent an easy question to difficult question or in this study from strongly disagree to strongly agree statement.

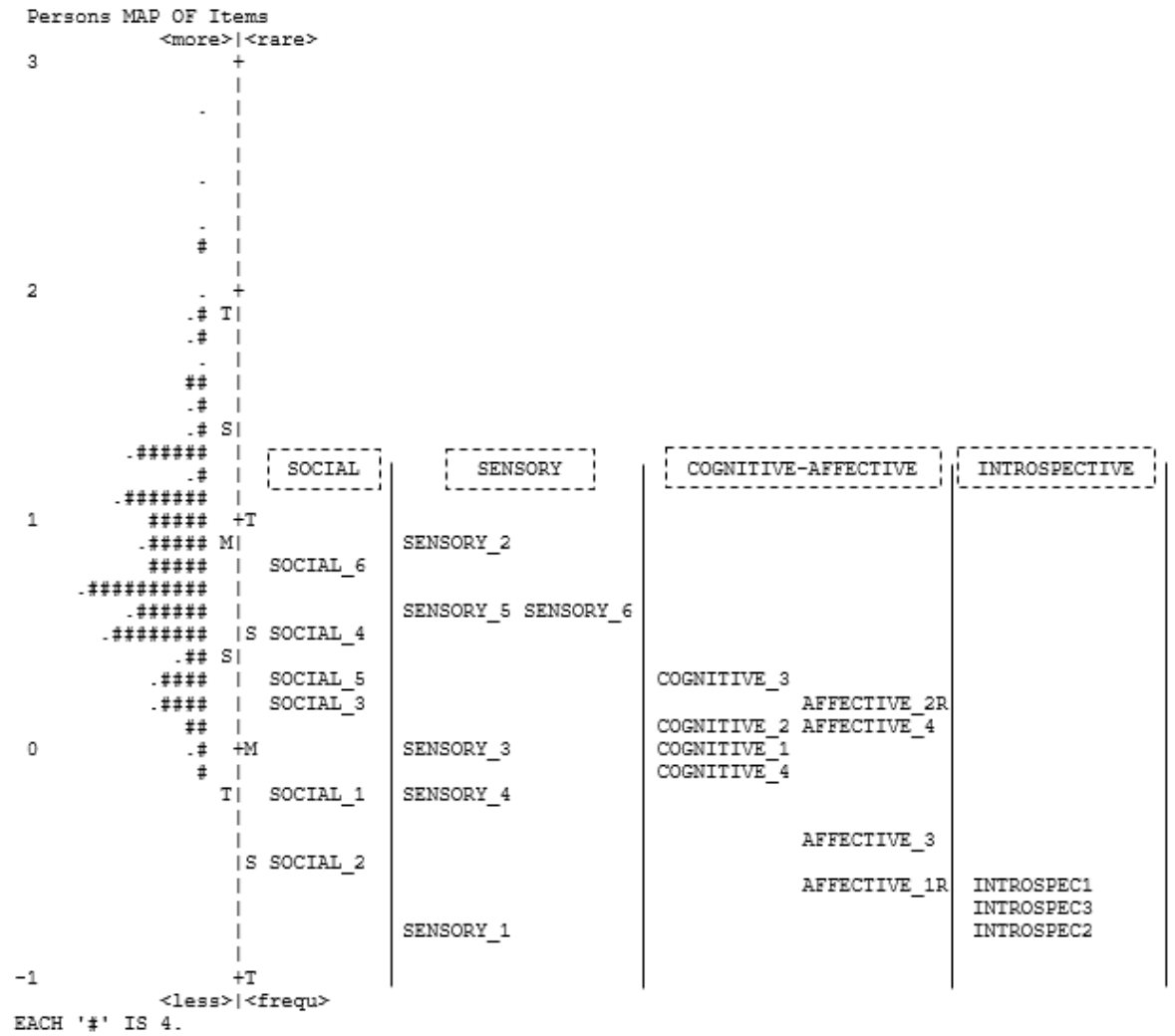


Fig.2 Item Distribution Map

Instead of PIDM, the analyses also gather information regarding on this study by using Summary Statistics as show in Figure 1 and are confirmed by Person and Item Measure tables where further findings can be seen. Rasch examines Person and Item fit by looking at the two types of fit values known as outfit and infit (Mahmud, 2011). Rasch basically examines *outfit* which is less threatening to measurement and easier to manage (Mutalib, Ghafar, Baharom, and Hamzah, 2015). It is vital to check the survey questions; as the instrument of measurement is measuring what it is supposedly to measure hence construct valid instrument. Three components of misfit to be checked are point measure correlation (*x*-value), outfit mean square (*y*-value) and outfit *Z*-standard (*z*-value). If all these three control items cannot be met, then we can say that the item is misfit and will be either removed from the analysis or need to be reviewed.

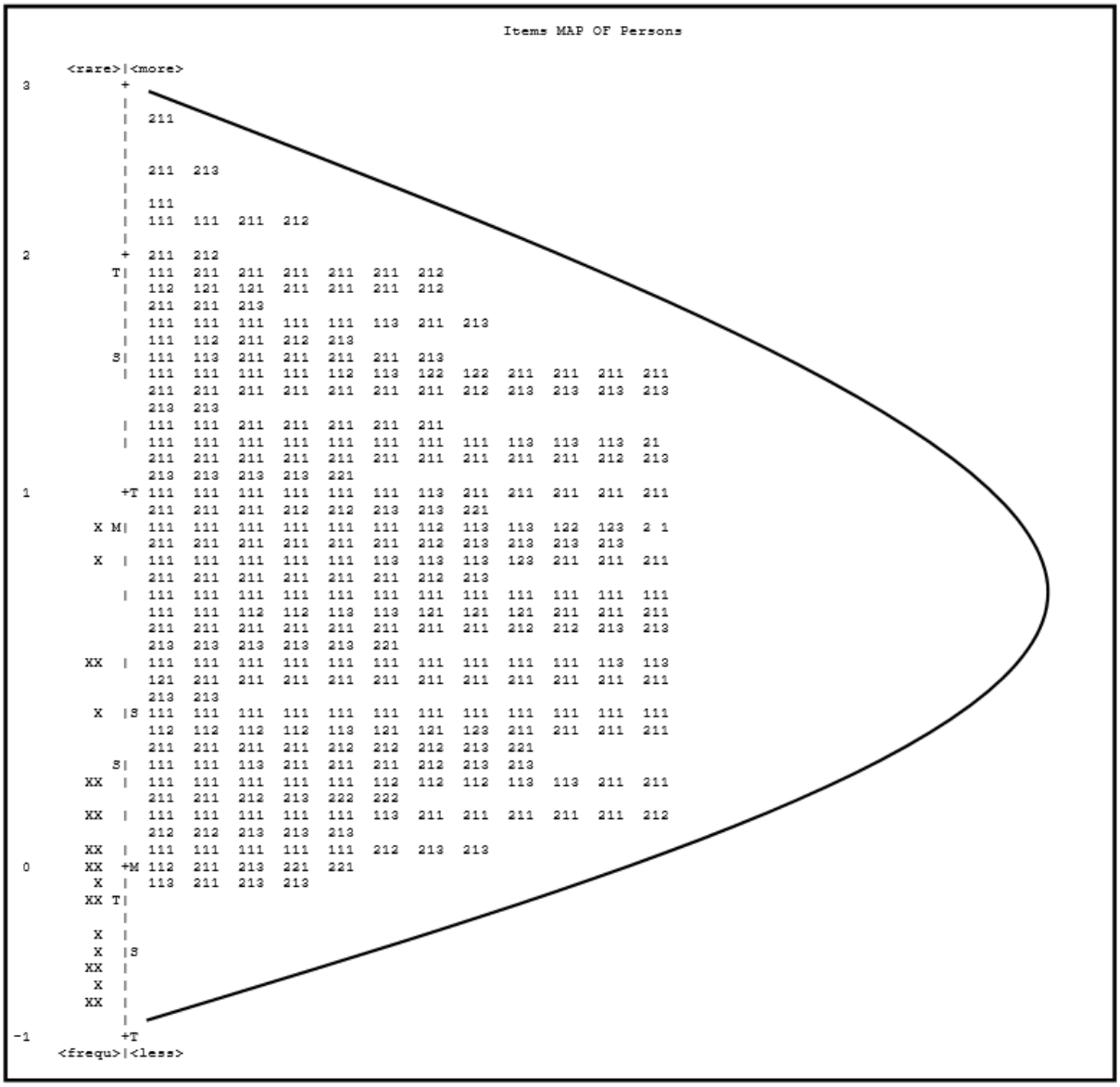


Fig. 3 Person Distribution Map

Figure 3 and 4 also give information on the measured values for maximum and minimum logit for *person* and *item*. The values for maximum person, Pmax= 2.82 logit was high while the minimum person, Pmin= -0.14 logit. The mean logit for person is 0.87 logit which was well above mean logit for item gives information that young visitors seem to expect the question is too easy for them. As shown in Figure 2, almost 61% of young visitors (N=206) rated this survey to be simple and possibility to answer agree for all questions is high. 39% (N=128) of young visitors thought that all questions is either agreed or disagreed.

In term of aspect of assessment, Sensory_1 and Introspective_2 were the statements under sensory and introspective components were the most agreed hence give indication that almost all young visitors agreed with the experience from their museum visit. The most disagreed question was Sensory_2 that record 0.89 logit which that statement was actually about 'I can touch most of the real artefacts in the museum' which slightly above young visitors mean logit. One of the possible conclusions for PIDM graph is almost all young visitors has the satisfying experiences on museum visits. Therefore, it shows that they are truly agreed with the scale.

4.1 Assessment validity, Cronbach alpha value (α)

The first information that needs to be verified is the validity of this assessment by analyzing the value of Cronbach-α shown in Figure 3. It shows that 0.76 is the value of Cronbach-α for this assessment which is well above the acceptable level 0.7 and, in normal statistical analysis this test has a high score reliability.

SUMMARY OF 334 MEASURED Persons

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	91.0	23.0	.87	.23	1.10	.0	1.08	-.1
S.D.	9.7	.0	.51	.05	.63	1.7	.71	1.6
MAX.	112.0	23.0	2.82	.57	3.72	4.6	5.29	5.0
MIN.	66.0	23.0	-.14	.18	.18	-5.1	.17	-4.9

REAL RMSE .28 ADJ.SD .43 SEPARATION 1.54 Person RELIABILITY .70
MODEL RMSE .24 ADJ.SD .45 SEPARATION 1.91 Person RELIABILITY .78
S.E. OF Person MEAN = .03

Person RAW SCORE-TO-MEASURE CORRELATION = .97
CRONBACH ALPHA (KR-20) Person RAW SCORE RELIABILITY = .76

Fig. 4 Summary statistics of person measured on satisfying experiences

SUMMARY OF 23 MEASURED Items

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	1322.0	334.0	.00	.06	1.00	.0	1.08	.6
S.D.	147.9	.0	.48	.01	.26	3.0	.43	3.7
MAX.	1527.0	334.0	.89	.08	1.74	6.0	2.57	9.9
MIN.	1004.0	334.0	-.82	.05	.69	-4.1	.66	-4.2

REAL RMSE .06 ADJ.SD .48 SEPARATION 7.54 Item RELIABILITY .98
MODEL RMSE .06 ADJ.SD .48 SEPARATION 7.90 Item RELIABILITY .98
S.E. OF Item MEAN = .10

UMEAN=.000 USCALE=1.000
Item RAW SCORE-TO-MEASURE CORRELATION = -.99
7682 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 18270.27

Fig. 5 Summary statistics of item measured on satisfying experiences

4.2 Person and item reliability

As shown in Figure 3 and 4, Person and Item reliability values are 0.70 and 0.98, respectively. As referred to Figure 4, 0.70 values for person reliability is characterized as Good while for item reliability 0.98 value is range as Very Good. As both values are higher than 0.7, hence this research got sufficient number of respondents.

4.3 Person and item strata spread

Other than reliability, the person and item spread should be determined. As shown in Figure 3 and 4, G = 1.54 is a person separation and G = 7.54 is for item separation. Young visitors separation is near to 2 hence student can be separated to 2 groups of strongly agree and strongly disagree meanwhile items can be separated into 8 groups of agree and disagree questions. As shown in Figure 4, these results can be classified as Fair for both person and item type of separation.

4.4 Instrument validity: Item fit

To check the instrument validity, firstly by looking at the Point measure correlation (PMC) = x-value that should be in range of $0.32 < x < 0.80$. PMC for item x = 0.13 for Affective_1R, x = 0.20 for Affective_2R and x = 0.30 for Cognitive_3 were the items that out of range as shown in Figure 5.

Item STATISTICS: MISFIT ORDER

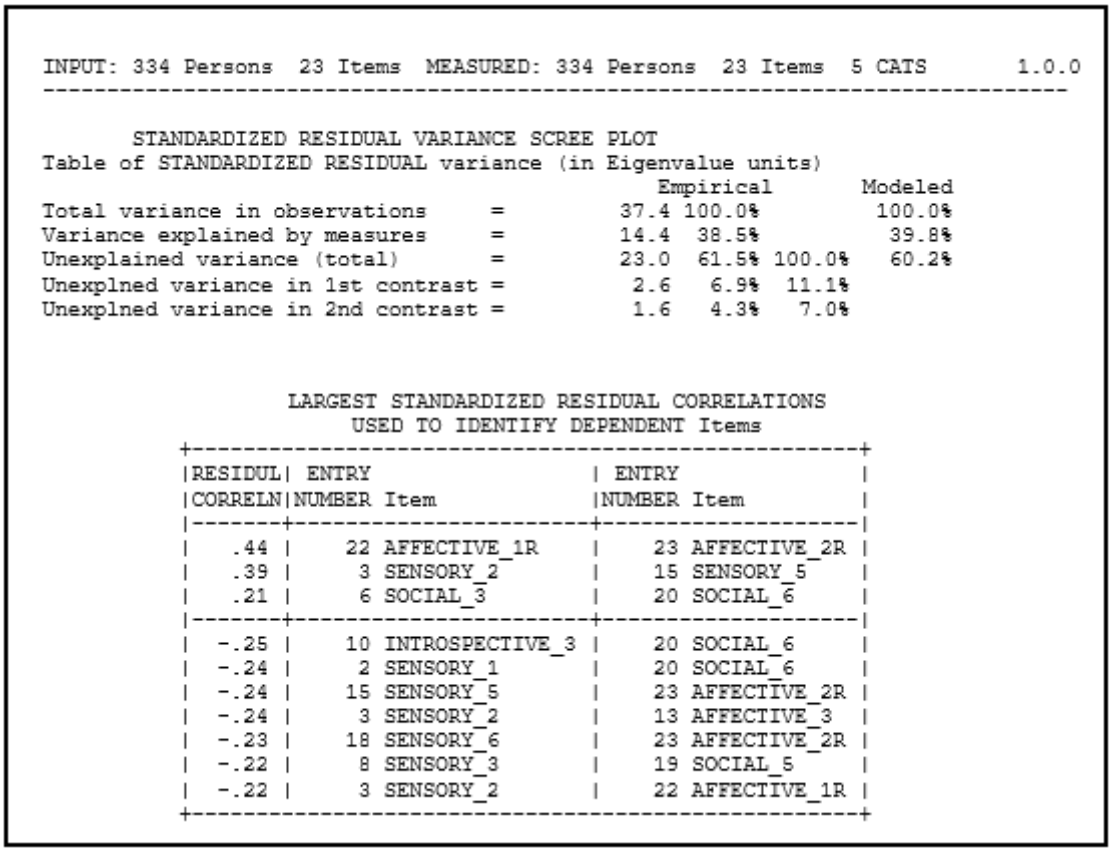
ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEA CORR.		EXACT MATCH OBS%	EXACT MATCH EXP%	Item
22	1482	334	-.55	.07	1.74	6.0	2.57	9.9	A	.13	48.2	50.3	AFFECTIVE_1R
23	1277	334	.21	.05	1.45	5.3	1.88	8.7	B	.20	26.9	35.0	AFFECTIVE_2R
16	1245	334	.30	.05	1.44	5.3	1.56	6.1	C	.30	29.3	34.5	COGNITIVE_3
12	1185	334	.46	.05	1.20	2.7	1.31	3.9	D	.34	33.8	33.4	SOCIAL_4
3	1004	334	.89	.05	1.23	3.4	1.25	3.5	E	.41	26.9	30.4	SENSORY_2
18	1118	334	.62	.05	1.15	2.3	1.23	3.1	F	.35	27.8	32.1	SENSORY_6
15	1122	334	.61	.05	1.12	1.8	1.13	1.8	G	.41	33.5	32.1	SENSORY_5
6	1284	334	.19	.05	.99	.0	1.10	1.3	H	.42	32.6	35.0	SOCIAL_3
20	1063	334	.75	.05	1.06	1.0	1.07	1.1	I	.44	28.7	31.0	SOCIAL_6
5	1467	334	-.48	.07	1.01	.2	1.05	.5	J	.38	55.1	47.5	SOCIAL_2
2	1520	334	-.77	.08	.99	.0	.90	-.8	K	.38	60.2	58.4	SENSORY_1
4	1485	334	-.57	.07	.88	-1.2	.98	-.1	L	.32	51.2	50.4	INTROSPECTIVE_1
19	1229	334	.34	.05	.89	-1.6	.91	-1.1	k	.44	35.3	34.4	SOCIAL_5
7	1333	334	.04	.06	.83	-2.2	.91	-1.0	j	.42	40.4	36.7	COGNITIVE_1
10	1504	334	-.67	.08	.91	-.8	.77	-2.1	i	.50	63.8	53.2	INTROSPECTIVE_3
21	1303	334	.13	.05	.84	-2.2	.89	-1.3	h	.47	36.5	36.0	AFFECTIVE_4
1	1392	334	-.16	.06	.80	-2.5	.86	-1.5	g	.34	45.2	40.5	SOCIAL_1
9	1527	334	-.82	.08	.86	-1.2	.75	-2.2	f	.46	67.7	60.1	INTROSPECTIVE_2
8	1349	334	-.01	.06	.77	-3.0	.81	-2.2	e	.51	46.4	37.5	SENSORY_3
11	1391	334	-.16	.06	.76	-3.1	.75	-2.8	d	.51	50.0	40.5	SENSORY_4
14	1309	334	.12	.05	.73	-3.8	.74	-3.3	c	.55	44.3	36.0	COGNITIVE_2
13	1447	334	-.38	.07	.74	-3.0	.73	-2.9	b	.50	54.8	45.9	AFFECTIVE_3
17	1371	334	-.09	.06	.69	-4.1	.66	-4.2	a	.49	50.3	39.1	COGNITIVE_4
MEAN	1322.0	334.0	.00	.06	1.00	.0	1.08	.6			43.0	40.4	
S.D.	147.9	.0	.48	.01	.26	3.0	.43	3.7			12.1	8.6	

Fig. 6 Item misfit of satisfying experiences

Next, the Outfit Mean Square (MNSQ) is checked. MNSQ = y-value that should be in range of $0.6 < y < 1.4$. In this analysis, item outfit y = 2.57 for Affective_1R, y = 1.88 for Affective_2R and y = 1.56 for Cognitive_3 were the outfit MNSQ that were out of acceptable range as refers to Figure 5. From theory, when the observation meets expectation, the MNSQ is equal to 1.0 but for these questions, it shows that this item needs to be reviewed. Finally, to check the outfit Z-standard value = z-value that should in range of $-2.0 < z < +2.0$. Again, items z = 9.9 for Affective_1R, z = 8.7 for Affective_2R and z = 6.1 for Cognitive_3 spotted to score out of acceptable range followed by z = 3.9 for Social_4, z = 3.5 for Sensory_2 and z = 3.1 for Sensory_6. The data in Figure 5 shows the misfit value for items, hence it is clear that items Affective_1R, Affective_2R and Cognitive_3 were the items that out of acceptable range for all three criteria can be classified as misfit item and needs to be reviewed.

4.5 Principal component analysis

As shown in Figure 5, unidimensionality feature appears critical in determining the measuring instruments in one direction and face. Instrument that has its ambiguities in measuring what should be measured will give confusing results. Rasch analysis requires at least 40% raw variances explained by measures as a sign of good unidimensionality instruments measure of 60% while most amazing unexplained variance in the 1st contrast should not exceed the regulatory limit of 15% (Azrilah, Saidfudin and Azami, 2013).



INPUT: 334 Persons 23 Items MEASURED: 334 Persons 23 Items 5 CATS 1.0.0

STANDARDIZED RESIDUAL VARIANCE SCREE PLOT
Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)

		Empirical		Modeled
Total variance in observations	=	37.4	100.0%	100.0%
Variance explained by measures	=	14.4	38.5%	39.8%
Unexplained variance (total)	=	23.0	61.5% 100.0%	60.2%
Unexplned variance in 1st contrast	=	2.6	6.9% 11.1%	
Unexplned variance in 2nd contrast	=	1.6	4.3% 7.0%	

LARGEST STANDARDIZED RESIDUAL CORRELATIONS
USED TO IDENTIFY DEPENDENT Items

RESIDUL CORRELN	ENTRY NUMBER	Item	ENTRY NUMBER	Item
.44	22	AFFECTIVE_1R	23	AFFECTIVE_2R
.39	3	SENSORY_2	15	SENSORY_5
.21	6	SOCIAL_3	20	SOCIAL_6
-.25	10	INTROSPECTIVE_3	20	SOCIAL_6
-.24	2	SENSORY_1	20	SOCIAL_6
-.24	15	SENSORY_5	23	AFFECTIVE_2R
-.24	3	SENSORY_2	13	AFFECTIVE_3
-.23	18	SENSORY_6	23	AFFECTIVE_2R
-.22	8	SENSORY_3	19	SOCIAL_5
-.22	3	SENSORY_2	22	AFFECTIVE_1R

Fig. 7 Principal component analysis

Raw variance obtained by calculation for the survey is 38.5% compared to Rasch Model that is 39.8%. The value obtained is slightly different from the expected value of 1.3%. It is found that 38.5% is lower than minimum value of raw variance by calculation which is 40%. Moreover, it can also be noted that there is 6.9% noise shown as unexplained variance in first contrast that cause the expected measurement according to Rasch model. However, this value is still acceptable because it was below the maximum value of 15%. There are 10 items that have been identified as same or confusing pair of dependent item as shown in Figure 6. There are two approaches that can be done; i) the item is maintained but the wording layout of the question should be changed so that the purpose of the question will be clearer, or ii) the items will be dropped out based on the method of filtering such as detection of item fit.

5. Discussion

The study have applied the Rasch Model in determining construct validity of the instrument. Rasch measurement model analysis was performed and the results of the survey were interpreted to determine the requirement for data reliability and validity, unidimensionality, and respondent-item fit in order to achieve a good reliability and validity of the instrument. It was crucial to determine whether or not the constructs in the instrument were measuring the specific objectivity within the same dimension and suitable for further analysis.

The satisfying experiences items indicate good internal consistency of the person in the scale in measuring a single latent trait or construct. The item reliability indices indicate that the items are very good as the values are close to 1.0. According to Bond and Fox (2015), the high item reliability also indicates that the 98% likelihood of replicability of the items would occur if these instrument to be given to another sample of respondents of the field. The person reliability result considered good with value 0.70, slightly matched with 0.78 value for the expected model.

The assessment of unidimensionality is crucial to ensure the satisfying experiences items in the instrument are measuring the specific objectivity within the same dimension. Thus, unidimensionality assessment for the items were lower than the threshold of 40%, which is an indication of a multidimensional possibilities for the model. To address this issue, the dimension of satisfying experiences were split in the questionnaire, which was divided into four subsections namely social, sensory, cognitive-affective and introspective experiences.

The Rasch model analysis confirmed that all the items in the questionnaire constructs were statistically reliable and valid for further analysis, and each item was measuring the specific objectivity under multiple dimension. The results were also supported by Cronbach's alpha test at 0.76, which showed good reliability for person-item data. Despite good reliability, three difficult items namely Affective_1R, Affective_2R and Cognitive_3 need to be reviewed due to misfit value beyond the limit of the Point measure correlation (PMC), Mean Square (MNSQ) and Z-standard. Hence, the application of the Rasch measurement model aims to provide a new dimension and technique, to examine the data reliability and validity of the instrument used for this study.

6. Conclusion

This paper has identified and discussed the Rasch model analysis approach to validate the instrument of young visitors' satisfying experiences scale in museum setting. This measurement has portrayed the ability of young visitors to response each item and its' level of difficulty. The results of overall reliability are shown by the pattern of respondents and items. This pattern illustrated on overall model compared to usual reliability analysis approach which focusses on the item value of Cronbach Alpha. Rasch measurement model is also applied in the analysis to provide potential information on young visitors' experiences in order to validate the satisfying experiences constructs. Further study should seek the relationship of satisfying experiences with other variables which can assist and guide museum professionals and researchers in order to have strategic understanding on visitors experience in museum.

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