



Assessing the content validity of Perjura using content validity ratio

Open
Access

M.N. Norashady^{1,*}, M.A. Muhammad Aziz Shah¹, M.A. Eftah¹, Y. Haniza²

¹ Faculty of Education and Human Development, Sultan Idris Education University, Tanjung Malim, Perak, Malaysia

² MIMOS Psychometrics Cluster, Kuala Lumpur, Malaysia

ARTICLE INFO

ABSTRACT

Article history:

Received 6 October 2016

Received in revised form 15 November 2016

Accepted 17 November 2016

Available online 3 December 2016

The main intention of this research is to examine the content validity of Marine Engineer Personality Inventory or PERJURA for student candidates of Diploma in Marine Engineering course at Malaysian Polytechnics by using Content Validity Ratio (CVR). The assessment was conducted through the evaluation among 14 subject matter experts (SME) selected via judgment sampling. Seven professional university experts involved with the expertise in psychology, psychometric, educational measurement and linguistics. The field experts specializing in particular fields of study consisted of seven practitioners who worked in the polytechnics field and maritime industry. The instrument involved 288 items with six main constructs. The results of the research show that the instrument has a good content validity and proved that PERJURA has great potential to be promoted as a good measurement instrument of personality screening for Marine Engineering student selection process. It is recommended to apply more sophisticated statistical analysis, such as the Item Response Theory (IRT) model for elaborating on quality items.

Keywords:

Content validity, Personality screening,

Content validity ratio, Expert panel,

Marine engineering student

Copyright © 2016 PENERBIT AKADEMIA BARU - All rights reserved

1. Introduction

Measuring and reporting on the content validity of an instrument or personality screening inventory which is used for student selection is the essence of this research. In the context of psychometrics, content validity refers to the extent to which a measure represents or cover all facets of a given social construct in PERJURA. Content validity also functions by determining how well the dimensions and elements of a concept in personality screening can be successfully defined [1]. The function is to validate every items in the instrument representing each measured construct [2].

The validity of an instrument defines the extent to which it actually reflects or is able to measure the construct being examined. The more evidence of content validity such as the expert evaluation

* Corresponding author.

E-mail address: norashady@gmail.com (M.N. Norashady)

is obtained, the higher the confidence of the researcher in the validity of the instruments being constructed [3]. For this research context, expert's evaluation is very important to be part of this research flow. In summary, consensus of the experts is the key factor for this study.

1.1 Theoretical foundation

The content validity of PERJURA is measured by quantitative measurement procedures by Lawshe [2], which is the Content Validity Ratio or CVR. The CVR is an item statistic that is useful in the rejection or retention of specific items. After items have been identified for inclusion in the final form, the content validity index (CVI) is computed for the whole test. The CVI is simply the mean of the CVR values of the retained items [4]. CVR used for measuring the content validity items through empirical measurements. CVR is a method from the classical measurement literatures, which is more practical from the aspect of time and costs, besides being easy to administer and fast in implementing [5]. These advantages have made CVR a choice among past researchers abroad [6] and research in Malaysia [7].

1.2 Conceptual framework

In the recent trend of increasing numbers of applicants for sea careers in Malaysia, it is more significant than ever to get the right person for the job. In the early of 2008 there was an argument in Ungku Omar Polytechnic (PUO), Ipoh concerning ways to improve and enhance the admission and structure of selection system for the marine engineering student. The prevailing system did not consider to take into account that working as a Marine Engineer or Maritime Officer has special requirements and hazards and often demands more endurance from a person than ordinary jobs ashore [8].

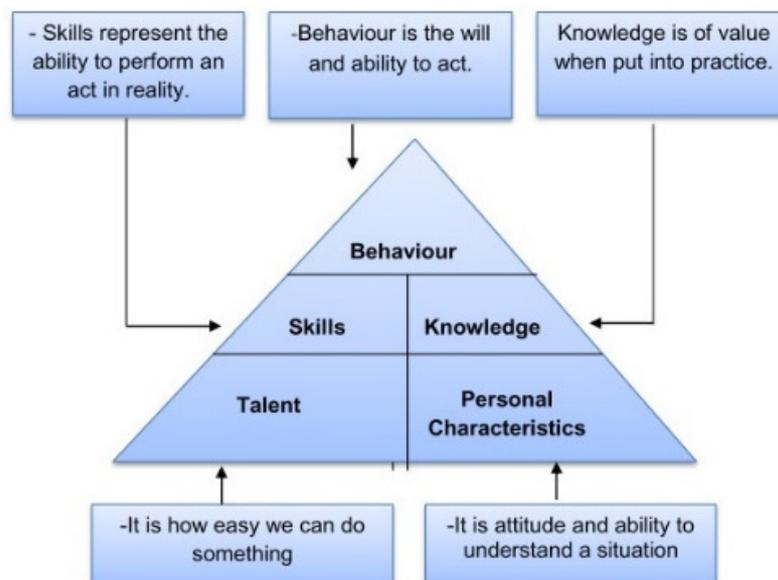


Fig. 1. Personality and competence requirements for seafarers

The current system assumed that anyone with the appropriate educational qualifications background could apply for this course. There was no attention of the candidate's personal suitability for this type of profession. By referring to the Fig. 1, the elements that are most difficult to measure

is 'Personnel Characteristics'. These elements are difficult to predict because it has been embedded in every person and cannot be seen easily with the naked eye.

PERJURA been developed based on the combination of Big Five Personality Theory and Workplace Personality Theory [9]. Therefore, it requires an expert in psychology to verify the items that are included in these instruments. Experts in the field of shipping and marine engineering lines are compulsory to include the elements of the working environment on board into every item. It includes also an expert in the field of industrial and organizational psychologist to make sure the item of personality and workplace match together [10].

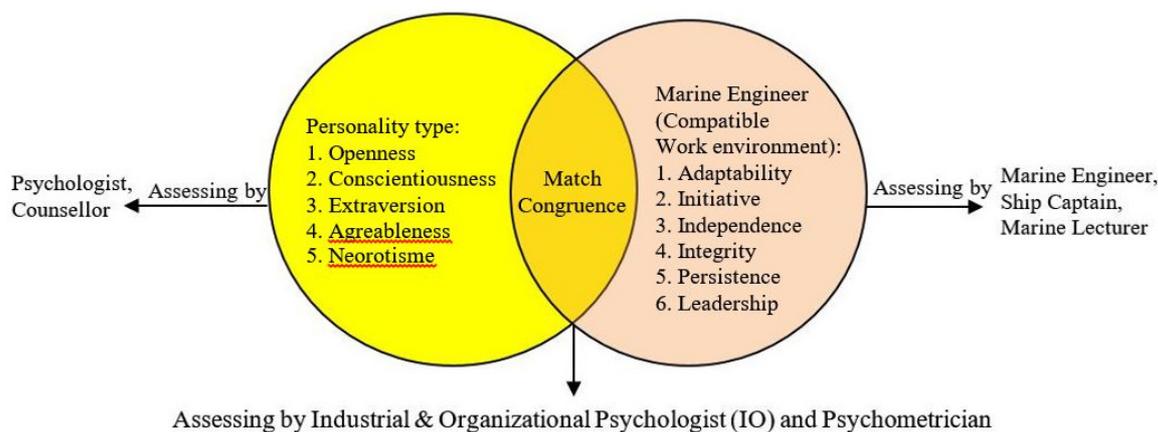


Fig. 2. Conceptual framework of content validity assessment

The Big Five Personality [11] are broad categories of personality traits. While there is a significant body of literature supporting this five-factor model of personality, researchers don't always agree on the exact labels of each dimension. However, these five categories are usually described as follows:

1. Extraversion: This trait includes characteristics such as excitability, sociability, talkativeness, assertiveness, and high amount of emotional expressiveness.
2. Conscientiousness: Common features of this dimension include high levels of thoughtfulness, with good impulse control and goal-directed behaviours. Those high in conscientiousness tend to be organized and mindful of details.
3. Agreeableness: This personality dimension includes attributes such as trustworthiness, altruism, kindness, affection, and other pro-social behaviours.
4. Neuroticism: Individuals high in this trait tend to experience emotional instability, anxiety, moodiness, irritability, and sadness.
5. Openness: This trait features characteristics such as imagination and insight, and those high in this trait also tend to have a broad range of interests [12].

There is another construct in this instrument which is 'Survival' construct. Researchers has developed their own items containing six sub construct. All of the sub construct was obtained from a survey conducted on 80 marine engineers all over Malaysian shipping company and interviews among a number of engineers and highly experienced sailor. These six sub construct are defined as follow:

1. Adaptability / Flexibility: Job requires being open to change (positive or negative) and to considerable variety in the workplace.
2. Initiative: Job requires a willingness to take on responsibilities and challenges.
3. Independence: Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.
4. Integrity: Job requires being honest and ethical.

5. Persistence: Job requires persistence in the face of obstacles.
6. Leadership: Job requires a willingness to lead, take charge, and offer opinions and direction.

2. Methodology

This research has referred to the definition of the word 'expert' as a panel of experts being made up of two categories: professional experts and field experts [13]. Professional experts help determine whether the measurements are well constructed for the psychometric testing [14]. The second type is the field experts. The total number of experts comprising in this research is 14 including seven professional experts and seven of field experts covered polytechnic lecturers from marine engineering department and marine engineer who got more than ten years of experience. The sampling technique used was one form purposive sampling, which is judgment sampling.

The criteria for selecting the panel of professional experts and field experts are based on academic qualification and experiences. The researcher also contacts the experts via telephone, letter and emails to explain the purpose of the study, the procedures and seek their approval to participate [4]. Although Lawshe's method only requires at least four members for the panel, the researcher has decided to involve as many experts as possible to increase the value of the model [2]. The total of 14 experts in this research is exceeding the recommendations from past researchers [15].

2.1 Research Design

In order to validate the content validity of the constructs, the quantitative approach [16], was undertaken in the following manner:

- a. First, relevant items from the existing literature on human and workplace personality were identified. This led to the construction of the questions and statement.
- b. Second, a content evaluation panel, consisting of experts from academia and/or industry who were related to the desired research area, was selected.
- c. Third, each member of the panel was then provided with the questionnaire formed in step 1. The panel members were requested to respond independently to each item in relation to a particular construct on a three-point scale as mention before.
- d. Fourth, the responses from the overall panelists were then pooled. This step also included counting responses that indicated 'essential' for each item.
- e. Fifth, the content validity ratio (CVR) for each item was estimated utilizing the formula $CVR = (n - N/2) / (N/2)$ [2], where N is the total number of respondents and n is the frequency count of the number of panelists rating the item as "3=essential".
- f. Finally, the CVR values obtained for each item were examined for their significance employing the standard table provided by [2]. If the estimated CVR value was equal to or above the standard value, then the item was accepted; other-wise it was eliminated. The significance level (standard value) depended upon the number of experts rating the item. The minimum number of experts required to rate each item should be five. The value of CVR ranged from 0 to 1.

3. Results and discussion

The demographic profile of the professional experts (N = 7) shows female (5, 71.4%) dominated male experts (2, 28.5%). The area of expertise covers psychology (2, 28.5%), industrial-organizational psychology (2, 28.5) psychometric (1, 14.8%) and linguistic (1, 14.8%). All of them are from various

universities such as University Kebangsaan Malaysia, University Pendidikan Sultan Idris and University Malaysia Terengganu.

For field experts (N=7) distribution shows Male (5, 71.4%) dominated female experts (2, 28.5%). It has three area of field expertise such as marine engineering education (4, 57.1%), industrial-organizational psychology (1, 14.8%) and psychology and counselling (1, 14.8%). The experts including the senior lecturer in the Department of Marine Engineering in Polytechnic of Ungku Omar, psychology and counselling officer from Polytechnic of Sultan Azlan Shah and Industrial Organization officer from Mimos Berhad.

The overall findings showed that only 37 items that are just below the critical value of 0.524. Almost all of the 37 items that need to be modified because of the word which is not in compliance with Malaysian culture. Further analysis should be carried out to test the content validity via statistical methods such as IRT model. Table 1 shows the examples of four items from 37 items that needs purification based on comparison among experts.

Table 1

Examples of items needs purification based on type of experts (N = 14)

| Item Number | Item | The CVR Category Expert Panel | | | Item Status |
|-------------|---|-------------------------------|----------------|----------------|--------------|
| | | Professional (N=7) | Field (N=7) | Total (N=14) | |
| | | CVRcrit= 0.741 | CVRcrit= 0.741 | CVRcrit= 0.524 | |
| 7. | As a child, I rarely enjoyed games of make believe. | 0.429 | -0.142 | 0.143 | Purification |
| 12. | I am intrigued by the patterns I find in art and nature | 0.429 | -0.142 | 0.143 | Purification |
| 28 | I often try new and foreign foods | 0.429 | 0.429 | 0.429 | Purification |
| 50 | I don't take civic duties like voting very seriously | -0.142 | 0.429 | 0.143 | Purification |

Based on Table 1, examples of four items had purified started with item (Q7, “When I was a child, I rarely enjoyed games of ‘pondok-pondok’ or ‘masak-masak’.”), (Q12, “Sometimes I get excited by certain artistic patterns that I found), (Q28, “I like to try new foods or recipes that I had never tried to taste”) and (Q50, I don't take civic duties like keeping the environment clean very seriously”). Most of the items in the PERJURA was adapted from NEO-PI-R, International Personality Item Pool (IPIP Scale) and Workplace Personality Inventory. Therefore, there are some item that do not fit with the socio-cultural in Malaysia and needs to be purified. Q7 were under Fantasy construct which shows clearly that the game of make believe is not quite familiar among student in Malaysia.

The SME have recommended to change the word of ‘make believe’ to ‘pondok-pondok’ or ‘masak-masak’. Q28 was under Action construct which changed to items that explained more common. This was due not everyone had the opportunity to enjoy a meal from abroad. The changes to items were not limited to only these eighty items, but also other items deemed inappropriate by matching indicator. Thus, after this, these items will go through the pilot study process among the Marine Engineering students at Polytechnic of Ungku Omar, Ipoh, Perak. Items that do not achieve minimum agreement by the expert panel must be either eliminated from the instrument or revised [3]. In this context, items will be revised by the research as preparation for pilot testing.

Table 2
 Item distribution after verifications by Expert

| Construct | Subconstruct | Number of items | Number of revised / eliminated item |
|---|-------------------------------------|-----------------|-------------------------------------|
| Openness vs Closedness to experience | Ideas (curious) | 8 | 1 |
| | Fantasy (imaginative) | 8 | 2 item revised |
| | Aestatics (artistic) | 8 | 2 item revised |
| Conscientious vs Lack of direction | Action (wide interest) | 8 | 3 item revised |
| | Feeling (excitable) | 8 | 1 item revised |
| | Values (unconventional) | 8 | |
| Extraversion vs Introversion | Competence (efficient) | 8 | |
| | Order (organized) | 8 | |
| | Dutifulness (not careless) | 8 | |
| Agreeableness vs Antagonism | Achievement striving (thorough) | 8 | 1 item revised |
| | Self-discipline (not lazy) | 8 | |
| | Deliberation (not impulsive) | 8 | |
| Neuroticism vs Emotional stability | Gregariousness (sociable) | 8 | 1 item revised |
| | Assertiveness (forceful) Activity | 8 | 1 item revised |
| | Activity (energetic) | 8 | 1 item revised |
| Survival vs Give up | Excitement-seeking (adventurous) | 8 | 1 item revised |
| | Positive emotions (enthusiastic) | 8 | 1 item revised |
| | Warmth (outgoing) | 8 | |
| 6 main construct | Trust (forgiving) | 8 | |
| | Straightforwardness (not demanding) | 8 | |
| | Altruism (warm) | 8 | |
| 36 sub construct | Compliance (not stubborn) | 8 | 1 item revised |
| | Modesty (not show-off) | 8 | |
| | Tender-mindedness (sympathetic) | 8 | 1 item revised |
| 288 item | Anxiety (tense) | 8 | |
| | Angry hostility (irritable) | 8 | 1 item revised |
| | Depression (not contented) | 8 | |
| 37 item revised | Self-consciousness (shy) | 8 | 1 item revised |
| | Impulsiveness (moody) | 8 | 1 item revised |
| | Vulnerability (not self-confident) | 8 | |
| 3 item revised | Adaptability (Flexibility) | 8 | 1 item revised |
| | Initiative | 8 | 3 item revised |
| | Independence | 8 | 3 item revised |
| 3 item revised | Integrity | 8 | 3 item revised |
| | Persistence | 8 | 5 item revised |
| | Leadership | 8 | 3 item revised |
| | | 288 item | 37 item revised |

4. Conclusion

Result of this study have practical impact as a complementary method for student selection practice. In conclusion, a total of only 37 items required refinement thus showing that the items were built with a good operationalization and conceptualization. The strength of CVR was prominent in this study when the differences in expert opinions could be seen clearly and easily. The researcher suggested that all 288 items that were refined would undergo a pilot study by polytechnic students using the IRT model. Through the IRT model, the items can be selected after some due consideration such as the appropriateness statistics such as unidimensional, local independence, item fit, item polarity and differential item functioning in order to fulfil Item Response Theory assumptions.

Acknowledgements

Special appreciation to the Centre for Research and Development of Polytechnics (PPPP), Putrajaya and Politeknik Ungku Omar, Ipoh in allowing us to conduct this study and the presentation of the findings at this conference. Similarly, the cooperation of respondents and SME from all universities and polytechnics involved.

References

- [1] Sekaran, U., Bougie, R., *Research Methods for Business: A Skill-Building Approach, 6th Edition*. 5th ed. New Delhi: John Wiley & Sons, 2011.
- [2] Wilson, F.R., Pan, W., Schumsky, D.A. "Recalculation of the Critical Values for Lawshe's Content Validity Ratio." *Measurement and Evaluation in Counseling and Development* 45, no. 3 (2012): 197–210.
- [3] DeVon, H.A., Block, M.E., Moyle-Wright, P., Ernst, D.M., Hayden, S.J., Lazzara, D.J., Savoy, S.M., Kostas-Polston, E. "A Psychometric Toolbox for Testing Validity and Reliability." *Journal of Nursing Scholarship* 39, no. 2 (2007): 155–64.
- [4] Matore, M.E.M., Khairani, A.Z. "Face Validity of IKBAR Using CVR Method." *International Journal of Advances in Science, Engineering and Technology* 3, no. 2 (2015): 63–66.
- [5] Tojib, D.R., Sugianto, L.F., "Content Validity of Instruments in IS Research." *Journal of Information Technology Theory and Application* 8, no. 3 (2006): 31–56.
- [6] Allahyari, T., Rangi, N.H., Khosravi, Y., Zayeri, F. 2011. "Development and Evaluation of a New Questionnaire for Rating of Cognitive Failures at Work." *International Journal of Occupational Hygiene* 3 (1): 6–11.
- [7] Shuib, M.A., Abdul Rahman, S., Mahudin, N.D.M. "Assessing Psychosocial Elements of Crowds during Hajj: Scale Construction and Content Validation." *5th National Seminar on Hajj Best Practices on Crowd and Health During Hajj*, no. August, 2013.
- [8] Jezewska, M., Jaremin, B., Leszczyńska, I. "Health Promotion in the Maritime Work Environment--Training of Leaders." *International Maritime Health* 58, no. 1–4 (2007): 129–37.
- [9] Wu, C.H. "Personality Change via Work: A Job Demand-Control Model of Big-Five Personality Changes." *Journal of Vocational Behavior* 92 (2016): 157–66.
- [10] Nicodemus, K.M. "Personality Type and Job Satisfaction." In . Boston: Springer Science Business Media, 2012.
- [11] Barrick, M.R., Mount, M.K. *The Big Five Personality Dimensions and Job Performance*. Personnel Psychology, 1991.
- [12] Hee, O.C. "Validity and Reliability of the Big Five Personality Traits Scale in Malaysia." *International Journal of Innovation and Applied Studies* 5, no. 4 (2014): 309–15.
- [13] Rubio, V.J., Aguado, D., Hontangas, P.M., Hernandez, J.M. "Psychometric Properties of an Emotional Adjustment Measure: An Application of the Graded Response Model." *European Journal of Psychological Assessment* 23, no 1 (2007): 39–46.
- [14] Brinkman, W.-P. "Design of a Questionnaire Instrument." *Handbook of Mobile Technology Research Methods*, 31–57, 2009.
- [15] Baheiraei, A., Khoori, E., Ahmadi, F., Foroushani, A.R., Ghofranipour, F., Weiler, R.M. "Psychometric Properties of the Adolescent Health Concern Inventory: The Persian Version." *Iranian Journal of Psychiatry* 8, no. 1 (2013): 28–36.
- [16] Archer, R.P., Smith, S.R., 2014. *Personality assessment*. Routledge.