Determining the Elements of TVET Teachers Competency for Nigerian Higher Learning Institutions

Lai Chee Sern, Mohamad Hamisu, Kahirol Mohd Salleh
Fakulti Pendidikan Teknik dan Vokasional, Universiti Tun Hussein Onn Malaysia, Batu Pahat, 86400 Johor, Malaysia.

E-mail: lcsern@uthm.edu.my

Abstract. This paper determined the suitable elements of competency framework to be applied for Nigerian higher learning institutions. Lack of competent TVET teachers in Nigerian higher institutions has led to several problems such as low quality graduates and unemployment. Competency is a vital element for assessing the quality of technical and vocational education and training (TVET) teachers. Therefore, this research determined the suitable elements of competency model to be applied to Nigerian TVET higher institutions based on Malaysian Human Resource Development Practitioners (MHRDP) competency model for workplace learning and performance (WLP). The study was fully quantitative and 218 cross sectional survey instrument was systematically distributed to TVET teachers from five higher institutions and 205 questionnaires were retrieved based on the stratified sampling technique. Exploratory factor analysis (EFA) was conducted to analyse the data. The research discovered that there are 19 elements relevant to the competency framework for TVET teacher Nigerian TVET higher institutions. A similar research should be undertaken to extend the result to reflect other Non-TVET institutions in Nigeria.

1.0 Introduction
Nigeria as developing country in the world, needs to have competent technical and vocational education and training (TVET) teachers for educational development and socioeconomic advancement that would lead to egalitarian society full of opportunities. In order to be among the successful countries of the world, higher learning institutions need to provide competent teachers with diverse technical know-how and advanced skills to meet the challenges of real time in higher learning institutions [1]. A lot of challenges have been taking place in the world of work including Nigerian higher institutions [2, 3, 4]. This has resulted in the need for continuous learning and updating competencies of employees or teachers across all ages. Therefore, competency needs are categorized in many dimension of life endeavour such as organisational competency, thinking competency and application competency possessed by employees in order to perform a task effectively and efficiently [5, 6]. It is more valuable for employees to develop and improve their work ability, capability and skills thoroughly most especially for TVET teachers [7]. Lack of competency in the higher institutions of learning can bring more challenges which required new ways to accomplish teaching and learning processes [8]. Therefore, it is understandable that the challenges occur in different ways usually affect the institutions worldwide specifically Nigerian higher institutions of learning. In order to minimize these unconditional challenges the competency framework need to be restructured.
Competency framework can be regarded as an instrument or tool that identifies the needed competencies in order to minimize the challenges that are currently existing in the institutions [9]. Consequently, many institutions are adapting and adopting competency based model or framework in order to achieve their objectives [10]. Therefore, this research aimed at determining the suitable elements of competency framework to be applied for Nigerian TVET higher institutions of learning. In specific, this paper focused on organisational, thinking and application competencies based on MHRDP competency model.

2.0 Literature review
The following section provides some information concerning the definition of competency and competency needs for TVET teachers.

2.1 Competency
Whenever we talking about knowledge, skills, attitude or behaviour. We are referring to quality. This word quality is regarded as “competence”. The word of “competence” comes from the Latin word “competere” which means "competent" that is a person’s ability to possess adequate skill, knowledge, attitude or behaviour to perform certain activity. Thus quality, ability and skills to do some certain activity competently.

The word competency was initially discussed and assessed by David McClelland in the early 1970s as a real features of individuals which they possess such as skills, knowledge and ability of worker performance which can be predicted, measured and assessed. Although, the first research of competency that came out with human resource development was done by McLagan in 1989 who believed competency is an area of knowledge, attitude and skills of individuals to produce vital key output.

For more than three decades, the term ‘Competency’ is defined by different researchers with different perceptions and perspectives and in different ways. According to McLagan and Suhadolnik [11], competency can be defined as a centre for knowledge, attitude and skills that are vital in producing key outputs. Likewise, Boyatzis [6] defined competency as the capability and ability of individual skills, knowledge and behaviour to complete the task assigned to them. While Lee [12] defined competency as set of related skills, abilities knowledge and behaviour which can influence the main aspect of workers job. Another researcher, Abel [13] conceptualised competency as to apply some knowledge into practice within a specific context. In addition, according to Sulaiman et al [14], competency refers to the workers or individuals or practitioners performance as related to the organisational performance in doing task or job that can be evaluated or measured. Taken together, competency in the context of current research is defined as the ability of an individual to apply the knowledge, skills and attitude to complete the given task that can be evaluated.

2.2 Competencies of TVET Teachers
Competencies of TVET teachers as illustrated by Andersson and Köpsén [15] and Arifin and Rasid [16] are exactly those skills, knowledge, attitudes, values, tasks and appreciations that are related to teaching and training within the sphere of TVET. Globally, TVET teachers should be competent in managing classroom and workshop, handling teaching aids, assessing and evaluating students’ performance, applying various teaching methods, recognising students’ learning styles, meeting the needs of students in the classroom, and more importantly, imparting the necessary technical knowledge and vocational skills efficiently and effectively [2, 17, 18].

According to German Council of Education outline two major areas of teacher’s competencies, namely educational competencies and specialized competencies [19]. The individual’s capability, ability or behaviour to organize around underline concept or intent, that should be their competencies [6]. It is a worker or individual performance as related to organisational performance in doing task or
job [8]. Therefore, from the above mentioned points we should know what kinds of competencies are require by TVET teachers in order to perform their duties as competent teachers.

Subsequently there are different TVET teacher’s competences by different scholars in different perspectives. Yunos, Esa, Jamil, and Rosli [20] and Ali [21] pointed out six different TVET teachers’ competences that need to be embedded in teacher training program such as skills, knowledge, ethics and professionalism, social process, social accountability and entrepreneurship. In addition, Deitmer and Heinemann [22] outlined five TVET teacher competencies, namely, professionalism, management, analytical, social and communication and knowledge about framework condition. Likewise, Setiabudhi [23] claims that it is compulsory for the TVET teachers to acquire competency related to teaching methodology, knowledge at workplace, research management and implementation and analyse of work process.

3.0 Methodology
The research was carried out in Bauchi State, north eastern Nigeria. Five TVET higher learning institutions in Bauchi were involved in this research, namely, Abubakar Tafawa Balewa University (ATBU), College of Education (COE) Kangyere Bauchi, Abubakar Tatari Ali Polytechnic (ATAP), College of Education (COE) Azare and Bauchi Institute of Education and Islamic Studies (BIEIS). Bauchi State is chosen because it the only state in the north east that has a high number of TVET higher institutions of learning in the region as mentioned above.

3.1 Research sample
A total of 427 Nigerian TVET teachers from five higher institutions of learning (University, Polytechnic and Colleges of education) were targeted in this research. The stratified sampling technique was applied. A sum of 218 questionnaires were distributed and 205 completed questionnaires were returned. The return rate was 94.04%. A total of 37.6% of the respondents were University TVET lecturers, 25.1% from Colleges of Education, and 27.3% from Polytechnics. Of the total respondents, 81% (166) were males with the remaining (19% or 39) being females.

3.2 Research instrument
Data were collected through the use of structured questionnaire which consists of questions on demographics and 25 elements of competencies from three research constructs: organisational competency (10 elements), thinking competency (8 elements) and application competency (7 elements) each was measured on a 5 point Likert scale, ranging from 1 = not important to 5 = extremely important. These items were adapted from Salleh, (2012). The reliability coefficient of the instrument was large, $\alpha = 0.88$.

3.3 Administration of Instrument
A total of 218 questionnaires were distributed to five higher institutions of learning based on systematic sampling distribution of 51% to each institution which consist of University with 84 questionnaires, while Polytechnic with 57 questionnaires and three Colleges of education (COE) with 77 questionnaires (COE Azare = 30 questionnaires, COE Kangyere = 25 questionnaires and COE BIEIS = 22 questionnaires). Out of 218 set of questionnaires distributed, 205 questionnaire were returned.

4.0 RESULTS
The outcomes of data analysis are presented as follows:

4.1 Data screening
The data was screened for univariate outliers. The screening analysis did not detect any data with extreme value. The minimum quantity of data for EFA was fulfilled, with 205 as final sample size.
4.2 Data Analysis: Exploratory factor analysis (EFA)

The use of EFA in this research was to determine the suitable elements of competency model to be applied for Nigerian TVET higher institutions. Firstly, the adequacy of sample size was checked. The Kaiser-Meyer-Olkin coefficient was 0.604, which was slightly above the recommended cut-off value of 0.6. The Bartlett’s test of sphericity was significant, \( \chi^2 (171) = 5104.33, p < .00. \)

The 25 measurement items used in the instrument were then subjected to the principal component analysis which showed the presence of three components with eigenvalues more than 1. The initial eigen values indicated that the factor one explained 26.43% of the variance, whereas the factor two and factor three explained 16.00% and 11.78% of the variances respectively.

The outcomes of EFA indicated that six elements have to be eliminated due to poor factor loadings (<0.4). See Table 1. Of the six elements, two elements belong to Thinking, Organisational, and Application Competencies.

### Table 1 Rotated Component Matrix

| Code  | 1  | 2   | 3   | Cronbach Alpha |
|-------|----|-----|-----|---------------|
| THI1  | .961 |    |     |               |
| THI3  | .960 |    |     |               |
| THI4  | .957 |    |     | .957          |
| THI6  | .885 |    |     |               |
| THI7  | .864 |    |     |               |
| THI8  | .819 |    |     |               |
| THI2  | .367 (removed) |     |     |               |
| THI5  | .341 (removed) |     |     |               |
| ORG2  |     | .843 |    |               |
| ORG4  |     | .834 |    |               |
| ORG5  |     | .581 |    |               |
| ORG6  |     | .556 |    |               |
| ORG7  |     | .518 |    | .741          |
| ORG8  |     | .487 |    |               |
| ORG9  |     | .455 |    |               |
| ORG10 |     | .406 |    |               |
| ORG3  |     | .368 (removed) |    |               |
| ORG1  |     | .319 (removed) |    |               |
| APP1  |     |     | .784 |               |
| APP2  |     |     | .765 |               |
| APP6  |     |     | .601 | .847          |
| APP4  |     |     | .595 |               |
| APP7  |     |     | .448 |               |
| APP3  |     |     | .354 (removed) |               |
| APP5  |     |     | .335 (removed) |               |

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 4 iterations
b. THI = Thinking competency, ORG=organisational competency, APP= application competency

The rotated component matrix in table 4 shows a meaningful loading of three factors with the Cronbach’s Alpha coefficient. Factor one ranges from .961 to .816 with $\alpha=.957$, factor two (2) ranges from .843 to .434 with $\alpha=.741$, factor three ranges from .833 to .488 with $\alpha=.847$ respectively.

4.3 Determinants of TVET teacher’s competencies in Nigerian tertiary institution

The factors with description of elements and factor loadings are presented in the table 6. Six elements were found to load under first construct which was labelled as thinking competency. Under second construct eight elements were found to load which was also labelled as organisational competency and five elements onto third construct which was labelled as application competency. All the constructs were labelled in line with their elements that loaded onto them. Therefore, all the elements that were used during the EFA analysis were reduced to 19 elements that are relevant to Nigerian TVET tertiary institutions. The factor loading matrix is presented in Table 2.

| Items                                   | Thinking Competency | Organisational Competency | Application Competency |
|-----------------------------------------|---------------------|----------------------------|------------------------|
| Workplace                               | .961                |                            |                        |
| Facilitation                            | .960                |                            |                        |
| Standard identification                 | .957                |                            |                        |
| Model building                          | .890                |                            |                        |
| Analytical thinking                     | .862                |                            |                        |
| Leadership                              | .816                |                            |                        |
| Communication                           | .843                |                            |                        |
| Work environment                        | .833                |                            |                        |
| Goal implementation                     | .591                |                            |                        |
| Buy in / Advocacy                       | .585                |                            |                        |
| Consulting                              | .515                |                            |                        |
| Negotiating /Contracting                | .487                |                            |                        |
| System thinking                         | .450                |                            |                        |
| Vision                                  | .434                |                            |                        |
| Staff selection theory and application  |                    |                            | .833                   |
| Training theory and application          |                    |                            | .825                   |
| Career development theory and Application|                    |                            | .544                   |
| Reward system theory and application    |                    |                            | .537                   |
| Process consultation                    |                    |                            | .488                   |

Six elements were loaded onto thinking competency, namely, workplace, facilitation, standard identification, model building, analytical thinking and leadership. These are the most appropriate elements of thinking competency to be applied to Nigerian TVET higher institutions based on the respondents’ feedbacks.

Similarly, eight elements were loaded onto organisational competency which includes communication, work environment, goal implementation, buy in / advocacy, consulting, negotiating/contracting, system thinking and vision which are the most suitable elements of
competency to be applied to Nigerian TVET higher institutions based on the answers of the respondents.

Lastly, five elements were found loaded in the application competencies, namely, staff selection theory and application, training theory and application, career development theory and application, reward system theory and application and process consultation.

5.0 Discussion
The research found that, out of the 25 elements of competency, 19 elements emerged to be the most suitable elements of competency applicable to Nigerian TVET higher institutions. This findings is supported by studies of Dubois and Rothwell [24] suggested that competency model has been shown to undergo several reviews over the years since its development. Similarly, Berge et al., (2002) mentioned that many institutions are adapting and adopting competency model in order to develop and achieve their needs and objectives.

Within the context of this research, organisational competency, thinking competency and application competency are the main area of concern, there are only 19 elements relevant to these competency component that is suitable for TVET teachers who serve in TVET higher institutions of learning. It means that six elements are not related to the three competency components based on TVET teachers’ perspective.

In organisational competency, there are two elements that are not relevant, namely, critical entrepreneurial issues and group dynamic. The irrelevance of identification of critical entrepreneurial issues to organisational competency might be attributed to business competency construct because identifying the critical business issues it has do with determining the key business issues and force for change and applying that knowledge to performance improvement strategies which more related to business competency construct, while group dynamic is likewise attributed to leadership competency construct because group dynamic is a way of assessing how group of people function or working together, as they seek to meet the needs of members of public which required a leader who can lead them to achieve their goals as both indicated in ASTD competency model developed by Rothwell et al. [25]. Therefore, this might be the reason why these elements do not belong to the organisational competency because this research focused only on organisational, thinking and application competencies.

In thinking competency, two elements that is competency identification and questioning are not applicable to thinking competency. This as a result of inappropriateness of competency identification to thinking competency, might be associated or linked with analytical competency construct in ASTD model because competency identification is a process of identifying the skills, knowledge and attitude which are required by employees to perform their duties effectively and efficiently. Therefore, this element is more related to analytical competency construct as indicated in ASTD. While, questioning is similarly attributed to technical competency construct because questioning is a method of collecting information via pertinent questions asked during surveys, interviews and focus group for the purpose of performance analysis which also more related to the technical competency construct also in ASTD model [26]. This might be the reason why these elements do not belong to the thinking competency because this study focused only on thinking, organisational and application competencies.

In the same instance, two elements are not relevant to application competency, namely feedback and institutional development. The feedback is more relevant to technical competency construct since feedback provides useful performance information to the appropriate people. While the irrelevance of
institutional development to application competency might be attributed to analytical competency construct because institutional development theory and application is a way of comprehending the theories, techniques and appropriate application of institutional development interventions by employers as they are used for performance improvement as pointed out in ASTD competency model. Therefore, this might be the reason why the two elements are not relevant to the application competency.

6.0 Conclusion
The 25 elements of competency components were later analysed in EFA thus, organizational, thinking and application competency, the result revealed 19 elements of competency from three constructs were also found to be suitable for Nigerian TVET higher institutions of learning. Thus, organisational competency with 8 elements, thinking competency with 6 elements and application competency with 5 element.

References

[1] Ismail, S., & Mohammed, D. S. (2015). Employability skills in tvet curriculum in Nigeria federal universities of technology. Procedia-Social and Behavioral Sciences, 204, 73-80.
[2] Oni, C. S. (2007). Globalization and its implications for vocational education in Nigeria. Essays in Education, 21(1), 30-34.
[3] Berg, S. A., & Chyung, S. Y. (2008). Factors that influence informal learning in the workplace. Journal of workplace learning, 20(4), 229-244.
[4] Paloniemi, S. (2006). Experience, competence and workplace learning. Journal of Workplace Learning, 18(7/8), 439-450.
[5] Salleh, K. M. (2012). Human resource development practitioners perspectives on competencies: An application of American society for training and development (astd) workplace learning and performance (wlp) competency model in Malaysia. Colorado State University: PhD. Thesis.
[6] Boyatzis, R. E. (2008). Competencies in the 21st century. Journal of Management Development, 27(1), 5-12.
[7] Billett, S. (2001). Learning in the workplace: Strategies for effective practice. Allen & Unwin, PO Box 8500, St Leonards, 1590 NSW, Australia.
[8] Salleh, K. M., Khalid, N. H., Sulaiman, N. L., Mohamad, M. M., & Sern, L. C. (2015). Competency of adult learners in learning: Application of the iceberg competency model. Procedia-Social and Behavioral Sciences, 204, 326-334.
[9] Fogg, C. D. (1999). Implementing your strategic plan: How to turn" intent" into effective action for sustainable change. Washington DC: AMACOM.
[10] Berge, Z., de Verneil, M., Berge, N., Davis, L., & Smith, D. (2002). The increasing scope of training and development competency. Benchmarking: An International Journal, 9(1), 43-61
[11] McLagan, P. A., & Suhadolnik, D. (1989). Models for human resource development practice: The research report. Washington, DC: ASTD
[12] Lee, Y. (2009). Competencies needed by Korean HRD master's graduates: A comparison between the ASTD WLP competency model and the Korean study. Human Resource Development Quarterly, 20(1), 107-133.
[13] Abel, M.H. (2008). Competencies management and learning organizational memory. Journal of Knowledge Management, 12(6), 15-30.
[14] Sulaiman, N. L., Salleh, M. K., Mohamad, M. M., & Sern, L. C. (2015). Technical and vocational education in malaysia: Policy, leadership and professional growth on Malaysian women. Asian Social Science, 11, 24, 153-161.
[15] Andersson, P., & Köpsén, S. (2015). Continuing professional development of vocational teachers: participation in a Swedish national initiative. Empirical Research in Vocational Education and Training, 7(1), 1-20.

[16] Arifin, M. A., & Rasid, R. M. (2017). The competent vocational college teacher: A proposed model for effective job performance. International Journal of Academic Research in Business and Social Sciences, 7(2), 2222-6990.

[17] Okoye, K. R., & I. M. O. (2015). Enhancing technical and vocational education and training in Nigeria for sustainable development: Competency based training approach. Journal of Education and Practice, 6(29), 66-69.

[18] Oluwasola, A. J. (2014) Professional competence of technical teachers: A factor analysis of the training needs of technical college teachers in ekiti state. Journal of European Education, 3(5) 281-293.

[19] Bauer, W., & Gollmann, P. (2008). Vocational Training Research for the Professionalisation of Vocational School Teacher. Bremen: ITB, Uni-Bremen.

[20] Yunos, J., Esa, A., Jamil, M., & Rosli, D. (2010). Transnational standards design framework for tvet teacher training program. Proceedings of International Conference on Education for Sustainable Development in Technical and Vocational Education and Training, Manila, Philippines. pp 227-237.

[21] Ali, M. (2015). Developing the knowledge-based human resources that support the implementation of the national dual training system (NDTS): Evaluation of tvet teacher’s competency at mara training institutions. Universiti Tun Hussein Onn Malaysia: PhD Thesis.

[22] Deitmer, L., & Heinemann, L. (2009). Evaluation approaches for workplace learning partnerships in vet: Investigating the learning dimension. Towards integration of work and learning (pp. 137-151). Springer Netherlands.

[23] Setiabudhi, J. D. (2013). Post study pre-service practical training program for tvet teacher students. The 2nd UPI International Conference on Technical and Vocational Education and Training. Indonesia: Bandung, pp. 36-46.

[24] Dubois, D., & Rothwell, W. (2004). Competency-based human resource management: Discover a new system for unleashing the productive power of exemplary performers. Nicholas: Brealey Publishing.

[25] Rothwell, W. J., Sanders, E. S., & Soper, J. G. (1999). ASTD models for workplace learning and performance: Roles, competencies, and outputs. Washington DC: American Society for Training and Development.

[26] Rothwell, W. J. (2002). Beyond training and development: State-of-the-art strategies for enhancing performance. New York: AMACOM.