International Education Studies; Vol. 9, No. 4; 2016
ISSN 1913-9020 E-ISSN 1913-9039
Published by Canadian Center of Science and Education

Exploring the Innovative Personality Characteristics among Teachers

Nooraini Othman[1]

[1] UTM Perdana School, Universiti Teknologi Malaysia, Malaysia

Correspondence: Nooraini Othman, UTM Perdana School, Universiti Teknologi Malaysia, Jalan Semarak, 54100 Kuala Lumpur, Malaysia. Tel: 3-21-805-157. E-mail: p-noraini@utm.my

Received: April 30, 2015 Accepted: May 20, 2015 Online Published: March 23, 2016

doi:10.5539/ies.v9n4p1 URL: http://dx.doi.org/10.5539/ies.v9n4p1

Abstract

The aim of this study is to explore the characteristics of innovative personality among teachers in Malaysia. Samples of the research were randomly selected among secondary school teachers in three districts in Malaysia. Research instrument was self-developed by the researchers based on interviews carried out with some resource persons who are both experts and authoritative in their fields, as well as through literature review. A pilot study was carried out among 30 respondents. Cronbach's Alpha value for the whole instrument is .952, indicating that it is reliable and suitable for actual data collection. A total of 484 sets of questionnaires were completed and gathered to form the data for this research. The data were then analysed using an advanced statistical method called Principal Component Analysis (PCA). Findings of the research concluded three constructs, namely, Leadership, Openness and Braveness. The constructs were labelled based on groups of items which were formed as a result of the PCA analysis. Meanwhile, Confirmatory Factor Analysis (CFA) was used to validate each dimension and to analyse the coherence of data based on model hypothesis. The findings of CFA indicated the goodness-of-fit values of the revised model, as follows: CMIN/DF=2.56; CFI=.935; and RMSEA=.057; with each figure above the threshold value.

Keywords: teachers, personality, innovative, leadership, braveness, openness

1. Introduction

One of the Malaysian government's main agendas is to develop world-class education system. However, the government is facing many challenges especially in handling the issue of unemployment among graduates. Thus, the government needs to focus on the aspect of dynamic and innovative human capital in enhancing its resilience and economic progress, as well as developing a community with exemplary values. This can be seen in the New Economic Model, which is based on innovation and productivity enrichment.

In 2011, the Malaysian Ministry of Education announced the National Higher Education Strategic Plan which plays a very important role in transforming Malaysia into a developed country with high income, highly competitive and innovative minded citizens. In relation to this plan, another plan, i.e. Innovative Human Capital Strategic Plan at Tertiary Level, was also announced by Universiti Pendidikan Sultan Idris (UPSI) in the same year.

The purpose of this five-year plan is to reduce the current innovation gap by creating a conducive innovative ecosystem and commercialise new findings. Prior to that, the Malaysian government focused on developing creative, dynamic and innovative human capital in the 10th Malaysian Plan as one of the cores in the nation's transformation strategies in achieving its vision to become a fully developed country by the year 2020. The above initiatives will facilitate the development of a holistic personality through education (Othman & Mohamad, 2014).

Incentives such as increased facilities and financial allocation have been given to the education sector to produce innovative human capital starting from school to tertiary institutions. Through these initiatives, students are hope to be able to face more practical and competitive situations while teachers are trained to lead and manage their students to become more innovative in their teaching and learning sessions.

In order to shape the quality of an individual, focus was given to the aspect of innovative personality in producing the best and valuable product, system and service. This effort can be seen in the ongoing national innovation strategy and higher education's strategic plan in developing innovative human capital to increase the nation's economy. Innovation is a chain to enhance the economic value to a higher level. The Malaysian Prime

Minister, Najib Abd Razak, announced the year 2012 as the National Innovation Movement year, in which one of the agendas was to restructure the strategies in transforming research and development products into ones with high commercial value via research institutions.

Nonetheless, do personnel characteristics and cultural values that promote innovation, quality and efficiency compete or complement each other? Ella, Mirriam and Eitan (2004) raised this question in their research to test if the personnel characteristics could enhance innovativeness and contribute to quality improvement. In their research entitled '*How leaders influence employees' innovative behaviour?*', Jereon and Deanne (2007) studied leaders' attitude in encouraging their employees to practice innovativeness in idea generation and implementation. A number of researches support the views that innovative individuals contribute to the success of any organisation (see for example, Van de Ven, 1986; Amabile, 1988; Axtell et al., 2000; Smith, 2002; Unsworth & Parker, 2003).

In the context of this research, innovative personality refers to the capability of the human resource to invent a new or better product or service in fulfilling the needs and demands of the society. According to Prather (2010), innovation depends heavily on the environmental factors that help innovation and the ones that can squash it. He developed a model namely, "Innovation Competence Model". There are three arenas of the competence model: education about the principles, tools, and techniques to solve critical business problems; and leadership in the workplace to enable innovation. He further argued that total leadership commitment from the top is the single most important factor in a company's level of innovation competence and its innovation success. Thus, based on this idea, the researcher has included leadership as one of the important characteristics in innovative personality profile. This idea is also supported by Gailly (2011). According to Hammond (2012), Forbes Insights study reveals five personality types that drive innovation. The study was based on a survey of 1245 executives in Europe, included a series of questions about the executives' attitudes, beliefs, priorities and behaviors. One of personality types is movers and shakers in which these refer to the leaders. These are the ones who like being in front, driving projects forward and push to get things done.

Braveness gives someone a high level of confidence in completing any task given to him or her. The ability to give creative ideas is also associated with braveness (Lee & Choi, 2003). Innovation needs braveness in creating and producing something new and different (Gailly, 2011). Another important characteristic is openness. Openness refers to open-minded people who are proactive and diverse in thinking. According to Foley (2014), diversity is good for innovation for it brings different perspectives, experiences and point of references. The 'Big Five' is seen to have the most scientific support from the world of psychology, in which sometimes called the OCEAN model. One of the aspects is openess that is openness to new ideas and to promote innovative and diverse thinking (Foley, 2014).

Thus, this study aimed to explore innovative personality characteristics among secondary school teachers in Malaysia by answering the following research questions:

1) What are the underlying constructs of the profile for innovative personality characteristics among teachers?

2) Is the profile valid and reliable?

2. Method

2.1 Respondents

The respondents are secondary school teachers selected from daily and boarding schools. They were randomly chosen from the three states in Peninsular Malaysia, namely, Johor (38.2% or 185 respondents), Kuala Lumpur (29.5% or 143 respondents) and Terengganu (32.2% or 156 respondents).

2.2 Instrument and Sample

The research instrument used in this research was self-developed by the researchers. There are two parts: Part A, which is related to respondents' demographic data; and Part B which contains 47 items related to innovative personality characteristics. Initially, based on literature review, there are nine important characteristics listed in innovative personality profile. After some discussions and revisions, the researcher agrees that there will be only four main characteristics that can be trained and developed. These characteristics were transformed into questionnaire items. PCA was run at the pilot testing stage. The final instrument was left with only three constructs consisted of 47 clean items.

Using PCA, the sample size goes according to the number of items in the instrument. Based on the rule of thumb, the minimum size must be at least five respondents for each item (Hair et al., 1998). Out of a total of 600 questionnaires distributed to the identified respondents, 484 completed questionnaires were collected and this

number fulfilled the requirement of this study, which included the use of CFA for data analysis.

2.3 Data Analysis

The collected data were analysed using PCA. PCA was used to identify the underlying constructs of the profile. The reliability of each construct was based on the value of Cronbach's Alpha. The analysis was done during the pilot testing prior to the real data collection. Then, the constructs generated by PCA were confirmed using CFA. CFA was used to test the reliability and validity of the constructs. For the purpose of data analysis, SPSS version 20.0 and AMOS version 20.0 were used.

3. Results

3.1 Demography

In this study, the number of female respondents is higher (71.9% or 348 respondents) than the male respondents (28.1% or 136 respondents). Looking at the ethnic data, majority of the respondents are Malay (484 respondents or 91.5%), followed by Chinese (24 respondents or 5.0%), Indians (14 respondents) and finally 3 respondents from other races. Meanwhile, analysis on the respondents' age showed that 47.1% of them were in the age group of 20-30 years, followed by 18% in the age group of 31-40 years and 2.5% in the group of 51-60 years at the time of the study. Majority of them are first degree holders (68%), followed by 28.1% of those with a master degree, and only 0.4% are PhD holders.

3.2 Constructs Development Using PCA

Principal Component Analysis (PCA) was used to reduce the number of items in the profile by generating the underlying constructs or factors. In this case, a profile of innovative personality characteristics would be developed. In order to determine the number of factors to retain, 4 criteria were used:

i. The presence of correlation with the other resulting factors (Bartlett's test, KMO, & MSA)

ii. Factors with Eigen values greater than 1.0

iii. The value of factor loading for each variable is greater than 0.4

iv. A minimum of 4 items are loaded for each factor

3.2.1 Profile Constructs

The Bartlett's test was significant, where $\chi^2(231) = 3324.23$, $\rho = .00$. The overall measure of sampling adequacy (KMO) is .92. This result shows the correlation between the items and it also supports the use of principle component analysis in this study. Meanwhile, measure of sampling adequacy (MSA) for each items shows that all values are greater than .80.

The Principal Component Analysis showed that there were three constructs generated by the data with Eigen values more than 1.0, accounting for 50% of the total variance explained. This result indicates three underlying constructs have explained more than 50% of the variance among the 22 variables in the profile. Meanwhile, 3 items were dropped due to their threshold values which are below .4. The factor loadings for each construct, as generated by PCA, are shown in Table 1 below.

Based on the contents of the items, construct 1 was labelled as Leadership (7 items). These items show the characteristics of those who can manage, motivate and contribute to the development of others. Factor 2 was labelled as Openness (6 items). These items show the characteristics of those who are open-minded in managing matters related to themselves and other people such as the ability to think outside the box and their preparedness in giving time and support to new ideas. Factor 3 was labelled as Braveness (6 items). These items represent those who are capable of making decisions, have high confidence and are brave enough to share their views and opinions. Those people have high motivation and are receptive to comments and critics.

Table 1. Factor loadings for each construct/ factor generated by PCA

Items	Factor 1 (Leadership)	Factor 2 (Openness)	Factor 3 (Brave)
I give space for others to try new ideas and be responsible on any risks.	.53		
I have the ability to take action before getting any instructions.	.61		
I know effective method to enhance the creativity & innovativeness of people under my supervision.	.71		
I need training to develop my creativity and innovativeness.	.55		
I am a good listener and reflector in any communication.	.65		
I think outside the box.	.69		
I help to identify barriers in achievements	.52		
I like sharing of information.		.60	
I give time and support to new ideas.		.65	
I learn from mistake.		.69	
I am responsible of my decision making.		.57	
I did not quit easily.		.65	
I accept critics.		.45	
I have detail knowledge of my field.			.56
I am confident in giving my views.			.68
I have high confidence.			.71
I have high understanding in creativity and innovative principle.			.43
I have high motivation.			.65
I can make my own choice.			.60

3.4 Constructs Validation Using CFA

In this study, first-order CFA was used. The hypothesized model is also known as measurement model and it consists of three constructs, namely, leadership, openness and braveness.

3.4.1 Assessing Adequacy of the Hypothesized Model

The hypothesized model was tested and the findings showed that the chi-square test for the overall model fit is χ^2 (132) = 311.23, ρ = .00. Due to the large sample size and the fact that it is known that ρ-value is very sensitive to the sample size, the ρ-value could not be used to measure the good-fit of this model. The results of the analysis on the overall fit of the model indicate that the model cannot be rejected. The fit indicator, CFI, exceeds the threshold of .90. The ratio of the minimum discrepancy to its degree of freedom (CMIN/df) is 2.36 and this is between the accepted value of between 2 and 5. The root mean square error of approximation (RMSEA) is .053, which is just within the acceptable value of .08. Thus, the fit of the data to the hypothesized model is considered as adequate. The hypothesized model is shown in Figure 1 below.

Figure 1. The hypothesized measurement model

3.4.2 Item Reliability Analysis

Based on the CFA analysis, there are several items which do not fulfil the criteria set for item validity and reliability test. The factor loading for each item shows the degree of each item in measuring the relevant construct, while the value of Squared Multiple Correlations (SMC) shows the degree of the reliability of each item in the model. The minimum value for SMC is .5. For a newly developed instrument, the minimum value for factor loading is .3 (Hair et al., 1998, 2006; Kline, 2005, 2011). Figure 1 shows that item T1 (factor loading = .28) and item BP1 (SMC = .45; factor loading = .20) do not fulfil the minimum value. Therefore, these items were dropped from the model and CFA was run again on a revised model. Figure 2 shows the revised hypothesized model after some modifications. Data analysis shows that all the SMC values and factor loadings for all the items are above the minimum value. The overall fit of the model indicates that the model cannot be rejected. The fit indicator, CFI, exceeds the threshold of .90. The ratio of the minimum discrepancy to its degree of freedom (CMIN/df) is 2.56 and it falls between the accepted value of between 2 and 5. Meanwhile, the root mean square error of approximation (RMSEA) is .057, which is just within the acceptable value of .08. Thus, the fit of the data to the hypothesized model is considered as adequate. The model is left with 16 items.

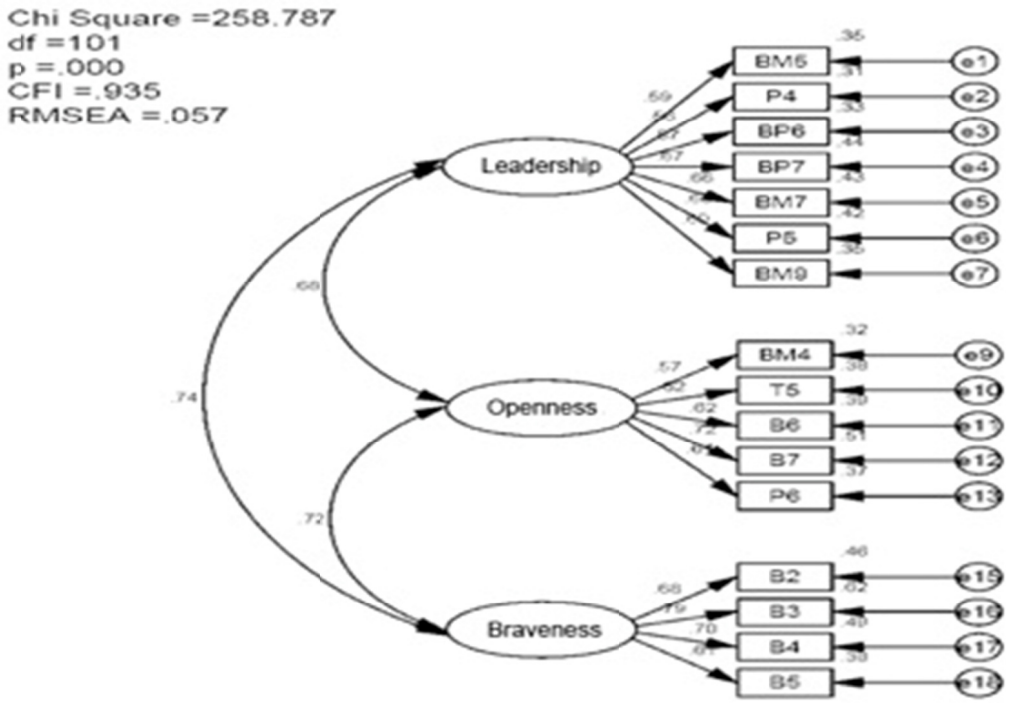

Figure 2. The revised hypothesized model

4. Discussion, Implications and Conclusion

The first construct generated by PCA is Leadership. This construct shows a leader's characteristics which are related to innovative personality development. The leadership traits need to be developed in each individual teacher so as to enable them to influence the innovative behaviour among their students. A leader is capable of influencing the behaviour of the employees (Yulk, 2002). According to Falk and Millar (2002), other than having academic qualifications, those who want to be successful should be able to apply their knowledge in their daily lives. Thus, self-management is needed in developing the leadership trait. Knox (2002) states that in order to achieve a successful organisation, a responsible leader is needed to implement innovative strategy and to inspire his subordinates to create innovative culture among them.

The second construct is Openness. This construct is also related to innovative personality development. By having an open-minded trait, an individual will be able to accept changes made in any organisation. According to LePine, Colquitt, and Erez (2000), open-minded individuals will be able to accommodate themselves easily to any changes. They will change their attitude and behaviour according to new ideas and situations (John, 1990).

The third construct generated by PCA is Braveness. This construct serves as one of the aspects in innovative personality development. Braveness refers to an individual who is capable of making changes in an organisation and able to view things from different perspectives. In the context of this research, the teacher is expected to be brave enough to make changes in the processes of teaching and learning with the purpose of instilling innovative values among the students.

The education sector contributes directly in the development of human resource and in the development of a nation. Apart from being a development agent, education becomes the bridging factor in directing human knowledge, training, potential, interest and all quality elements to more dynamic, innovative and progressive dimensions in moving the country towards a better and high-income country. Thus, education plays an important role in shaping the quality of its students, not only from the aspects of academic, co-curriculum and personality but also in enhancing the human capital value through innovation and intellectual capabilities. In line with the national agenda, the government gives much emphasis on producing human capital with high thinking skill, good personality, creative, innovative and competitive. Given these aspirations, teachers should be trained and

developed to become innovative teachers in order to produce innovative students.

Teachers are responsible to educating their students in academic aspects and developing the innovative culture among them. Without an innovative teacher, it is difficult to expect the birth of an innovative generation. It is obviously important for the teachers to equip themselves with the necessary skills. Thus, the development of this profile will assist teachers and educators alike to understand the innovative characteristics and develop their personality parallel to these characteristics in order to produce innovative students as future innovative citizens.

The Ministry of Education, through higher education institutions, needs to have a specific teachers training programme in developing teaching skill and instilling innovative characteristics among the students. This profile is able to give input to the ministry in developing and strengthening teachers in shaping innovative and competitive human capital.

Innovativeness needs someone to act or to do something outside the normal thinking framework. In this context, leadership is one of the cores in moving the initiative in creating the innovative culture. Openness can make every party concerned learn new things and assess the best approach to instilling the said culture. Meanwhile, braveness is the motivating factor in making changes and looking things from different perspectives. It is the combination of these characteristics that will eventually help to develop innovative human capital.

Acknowledgments

This study was financially supported by Universiti Teknologi Malaysia's Research University Grant (RUG) under vote no. 01J21 and Malaysian Ministry of Education's Fundamental Research Grant Scheme (FRGS) under vote no. 04F96.

References

Amabile, T. M. (1998). How to Kill Creativity. *Harvard Business Review*, *76*(9), 77-87.

Axtell, C. M., Holman, D. J., Unsworth, K. L., Wall, T. D., Waterson, P. E., & Hurrington, E. (2000). Shopfloor Innovation: Facilitating the Suggestion and Implementation of Ideas. *Journal of Occupational and Organizational Psychology*, *73*, 85-265. http://dx.doi.org/10.1348/096317900167029

Ella, M., Miriam, E., & Eltan, N. (2004). Do Personel Characteristics and Cultural Values That Promote Innovation, Quality, And Efficiency Compete or Complement Each Other? *Journal of Organizational Behavior*, *25*.

Falk, I., & Miller, P. (2002). *Implications of 'non-standard work practices' for literacy and numeracy*. ALNARC National Research Program Commonwealth of Australia: University of Tasmania.

Foley, P. (2014). *Innovation Psychology: Five Personality Traits of Innovators*. Retrieved June , 2015, from http://www.innovationexcellence.com/blog/2014/12/29/innovation-psychology-five-personality-traits-of-innovators/

Gailly, B. (2011). *Developing Innovation Organizations: A roadmap to Boost your Innovation Potential*. London: Palgrave Macmillan.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Prentice Hall.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis* (6th ed.). New Jersey: Pearson Education Inc.

Hammond, M. (2012). *Forbes Study Reveals Five Personality Types that Drive Innovation*. Retrieved June 2nd, 2015, from http://www.smartcompany.com.au/legal/intellectual-property/25264-forbes-study-reveals-five-personality-types-that-drive-innovation.html

Jereon, P. J., & Deanne, N. (2007). How Leaders Influence Employees' Innovative Behaviour. *Research Paper*, *10*(1), 41-64.

John, O. P. (1990). The "Big-Five" Factor Taxononomy: Dimension of Personality in the Natural Language and in Questionnaire. In L. A. Pervin (Ed.), *Handbook of Personality: Theory and Practice*. New York: Guilford Press.

Kline, R. B. (2005). *Principles and Practice of Structural Equation Modeling* (2nd ed.). America. Guilford Publications.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed.). America. Guilford Publications.

Knox, S. (2002). The Boardroom Agenda: Developing the Innovative Organization. *Corporate Governance*, *2*(1), 27-36. http://dx.doi.org/10.1108/14720700210418698

LePine, J. A., Colquitt, J. A., & Erez, A. (2000). Adaptability to Changing Task Contexts: Effects of General Cognitive Ability, Conscientiousness, and Openness to Experience. *Personnel Psychology*, *53*(3), 563-593. http://dx.doi.org/10.1111/j.1744-6570.2000.tb00214.x

Othman, N., & Mohamad, K. A. (2014). Integrated System in the Malaysian Education Paradigm: A Catalyst for a Holistic Personality Development. *International Education Studies*, *7*(5), 8-14. http://dx.doi.org/10.5539/ies.v7n5p8

Prather, C. (2010). *Manager's Guide to Fostering Innovation and Creativity in Teams*. Wisconsin: McGraw Hill.

Smith, G. P. (2002). The New Leader: B*ringing Creativity and Innovation to the Workplace, Chart Your Course*. Conyers, Georgia. USA: Saint Lucie Pr.

Unsworth, K. L., & Parker, S. K. (2003). *The New Workplace: A Guide to the Human Impact of Modern Working Practice*. London: John Wiley & Sons.

Van de Ven, A. (1986). Central Problems in the Management of Innovation. *Management Science*, *32*(5), 590-607. http://dx.doi.org/10.1287/mnsc.32.5.590

Yulk, G. (2002). *Leadership in Organizations* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.