

## Personality profiles of Malay and Chinese engineering students

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**ABSTRACT:** In this study, the authors seek to investigate the personality trait orientations of students currently majoring in engineering courses. The samples comprised 432 undergraduate engineering students who had been randomly selected to participate in the study. The NEO PI-R Personality Inventory by Costa and McCrae was used to assess the personality profile. The Malay engineering students in the study were found to have a higher level of Neuroticism ( $t=4.061$ ,  $p = 0.000$ ) and Agreeableness ( $t=3.449$ ,  $p = 0.001$ ) than the Chinese engineering students. It was found that the Chinese engineering students were higher on the Openness domain ( $t=-2.946$ ,  $p = 0.003$ ) than their Malay colleagues. The implication of personality differences on academic achievements and on the future desirable job attributes for prospective engineers are discussed in this article.

### INTRODUCTION

Studying the personality dimensions of engineering students is essential from the perspective of the career decision process. Personality provides two important aspects as follows:

- *Suitability*: the matching of a person's personality with his/her chosen academic major or vocational preference;
- Personality is related to the personal qualities desired for future engineers to function better in the engineering profession.

The suitability factor is associated with the person-environment-fit framework pioneered by several researchers such as Crites and Holland [1][2]. Holland theorised that different personality types have different interests, competences and dispositions towards the work environment [2].

An assumption made when this theory is extended to the area of educational choice is that the more suitable and appropriate the matching of one's personality with the selected academic major, then the more likely that the student will be successful and committed.

Some other earlier findings using the Myers-Briggs Type Indicator (MBTI) effectively characterised differences in the ways that engineering students approach learning tasks, respond to different forms of instruction and classroom environments, and formulate career goals [3-5]. For example, it was found that extraverts reacted more positively than introverts when first confronted with the requirement that they work in groups on homework.

As for the second part of the role of personality, it is suggested that personality plays an even more instrumental role in human relation aspects, such as when managing conflicts, persuading

and negotiating with colleagues, and when making ethical judgements. Conflict management, for example, requires students to learn to be patient to others and being emotionally stable. Personality is also related to problem-solving skills. For instance, openness to ideas, assertiveness and meticulousness are needed during the problem-solving process. All of these human aspects of engineering soft-skills are rooted back to the personality disposition or traits domain.

Thus, it has now been realised and practised by many current employers that they look not only to the engineering-cum-technical competence, but also for specific personality types to fit certain roles in engineering-related jobs.

In this present study, the authors attempt to look at this aspect using a common psychological method to measure personality trait distribution, especially among Malay and Chinese engineering students. At minimum, the authors shall examine the pattern of the personality traits of enrolled students. Do they possess the personality dimension as desired by the engineering profession?

### THE FIVE FACTOR MODEL OF PERSONALITY

In the present study, the authors employed another personality model that has received widespread agreement regarding its universality and usability. The Five Factor Model (FFM) is currently the best model for describing the taxonomy of personality traits [6][7]. It has been proposed that the model's five basic factors constitute the basic structure of human personality as follows:

- Neuroticism (N);
- Extraversion (E);
- Openness to Experience (O);
- Agreeableness (A);
- Conscientiousness (C).

This assertion has been supported using different personality questionnaires, self-reports, peer ratings, factoring procedures and sampling subjects [7].

Few studies use the FFM model. Lounsbury et al studied a sample of information science professionals and found significant correlations between personality traits and career satisfaction (as well as life satisfaction) for six of the seven personality traits studied (ie assertiveness, conscientiousness, emotional stability, extraversion, openness, optimism and tough-mindedness) [8].

Although this sample represents only one general occupational group, Lounsbury et al found that there was extensive similarity in personality-career satisfaction relationships across diverse occupational groups including engineering workers [8][9]. Personality traits correlated with career satisfaction included the FFM traits of conscientiousness, extraversion and openness plus other, narrower traits, such as assertiveness, customer service orientation and human managerial relations orientation.

## RESEARCH QUESTIONS

In the current study, the authors attempt to address this basic problem – what constitutes personality differences between Malay and Chinese engineering students? The findings could help in understanding some of the differences in the personality profiles of engineering students from different racial backgrounds.

## PURPOSE OF THE STUDY

The present study had the following two main purposes:

- To examine the personality profile of Malay and Chinese engineering students;
- To examine whether there were significant differences in the personality profiles between Malay and Chinese engineering students.

## SUBJECTS

The total sample comprised 432 undergraduate students (284 Malay and 148 Chinese incorporating 247 males and 181 females – four data were not included in the final analysis). These students were enrolled in the four major departments of the Engineering Faculty at the Universiti Kebangsaan Malaysia (UKM) in Bangi, Malaysia. Most of the students were in their third or fourth years of study. They were involved in a larger scale of study dealing with personality and academic major decision-making. The students' age range was from 18 to 20 years. All participation was voluntary.

## INSTRUMENTS

The present study used a translated Malay version, which was based on an original version of the NEO Personality Inventory-Revised (NEO PI-R) [6]. A psychometric assessment of the translated instrument has been documented [10].

The overall alpha coefficients of the Malay NEO PI-R domain scales were 0.87, 0.86, 0.69, 0.82 and 0.91 for N, E, O, A and C, respectively. This inventory consisted of 240 items that had been developed through rational and factor analytic methods, and measured five major domains of personality, namely: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. It took about 40-50 minutes to complete the questionnaire.

## RESULTS

### Mean-Level Comparison between Malay and Chinese Students

Table 1 shows a comparison of the mean scores of the factors and facets between Malay and Chinese engineering students as revealed through this study.

At the factor level, it seems that the Malay students scored higher than the Chinese students on Neuroticism and Agreeableness. On the other hand, the Chinese students scored

Table 1: Means and standard deviations of the domain and selected facets between Malay and Chinese engineering students.

Domain	Malay N=284		Chinese N=148		t	p
	Mean	SD	Mean	SD		
N: Neuroticism	98.8	15.9	91.4	18.9	4.24	0.00
E: Extraversion	107.6	13.9	105.2	15.6	1.63	0.10
O: Openness	102.9	10.0	105.9	12.9	-2.68	0.01
A: Agreeableness	113.4	12.1	109.1	11.3	3.57	0.00
C: Conscientiousness	114.4	15.4	113.2	17.0	0.75	0.45
<i>Facets</i>						
N1: Anxiety	18.3	4.0	16.3	4.4	4.62	0.00
N3: Depression	17.1	4.1	15.7	5.0	3.00	0.00
N4: Self-consciousness	19.2	3.1	16.8	3.3	7.41	0.00
N5: Impulsiveness	17.7	3.8	16.5	3.4	3.40	0.00
E4: Activity	17.3	2.9	16.4	3.1	3.00	0.00
E6: Positive emotions	20.7	3.7	18.9	4.4	4.41	0.00
O1: Fantasy	15.9	3.1	16.6	3.1	-2.28	0.00
O3: Feelings	19.3	3.2	18.1	3.3	3.56	0.00
O4: Actions	15.8	2.6	16.6	3.0	-2.56	0.01
O6: Values	15.8	2.6	18.1	2.7	-8.68	0.00
A2: Straightforwardness	19.1	4.1	18.2	4.0	2.20	0.03

higher on Openness to Experience. At the facet level, Malays scored significantly higher on N1: Anxiety, N3: Depression, N4: Self-consciousness and N5: Impulsiveness compared to the Chinese students.

Chinese students were found to be more open, as they scored higher on most Openness facets than did the Malays, although Malay students scored higher the Openness facet of O4: Openness to Actions. On the other hand, Malays were found to be more Agreeable people than the Chinese students: five of the Agreeableness facets of the Malay students had higher means than those of the Chinese, with the exception being A3: Altruism. A comparison of the Conscientiousness facets has revealed that Malay and Chinese students' scores were almost similar.

## DISCUSSIONS

The present study shows that the surveyed Malay students in engineering were more anxious, depressed, self-conscious and impulsive in comparison with their Chinese colleagues. Higher anxiety signals lack of self-confidence and this is not considered a preferable quality of the future engineer. Similarly, higher scores on depression and self-consciousness also imply that Malay engineering students were susceptible to depression, especially during some important academic or work tasks in the future. Being self-conscious or *malu* is again not a desirable personal quality for future engineers.

On the other hand, the Chinese students were more open-minded than the Malays. They were higher on openness to fantasy, which can be associated with creativity and imagination. Lower openness to values among Malay students is expected. Items on openness to values explicitly indicated the idea of flexibility on the moral status of certain conduct. Malays normally perceive this idea as against the values stated by their religion. However, the Malay students were higher on openness to feelings. Higher scores in this facet may be associated with Malays being easily involved in emotion-related phenomena like being in love while in campus.

Openness is indeed a very important personal quality needed for future engineers. Engineers love to figure things out and find out how things are made. It is this mentality that helps propel them through their college classes. Some engineers feel like college was the first time that their curiosity could be satisfied, the first time that they could delve deep enough into a problem, see all sides of how something worked, and obtain a solution. Dollinger found Openness to be positively related to information-oriented identity style, a style possessed by those who prefer to seek out and process information actively before making decisions [11]. Interestingly, this is what is going to be experienced by students in engineering later in their studies and in the work environment.

Engineering education involves teaching students how to think through a problem in order to solve it. The fascinating aspect about problem solving in engineering is that there is almost never a *right* answer. Openness to ideas provides a tendency to identify several different approaches to solve a problem, and then it is up to the individual to show everyone how this solution meets the needs of the design. Chinese students were higher on Openness to Action. According to Costa and McCrae, Openness to Actions is seen as behavioural in the willingness to try different activities, and a preference for novelty and variety, which is also among the characteristics of engineering students [6].

## CONCLUSION

The overall findings of this study suggest that female and Malay students seem to be disadvantaged when compared with Chinese students. If female and Malay students were prone to be more anxious, more depressed, and more *malu* and impulsive, then most likely they may be subjected to many negative outcomes. Studies have shown that self-esteem is closely related to these negative traits, which in turn can affect performance-based activities like examinations.

However, female students possess some good personal dispositions in that they were more orderly and dutiful. Future employees should foresee recruiting more female engineers as they are prone to obeying rules and regulation, are diligent at work and make things more orderly. Following procedures could be expected of female engineers.

Chinese students possessed better qualities, especially being open to ideas. They were found to be less susceptible to depression, *malu* and anxiety-related situations, and be less impulsive.

It can be seen that dispositional factors like personality traits play an important role during study as well as during vocational practice.

## IMPLICATIONS

The expectation is that students intending to major in engineering should possess the desired personal qualities for the engineering profession. They are expected to not only be competent in their respected fields, but also possess good personal templates so that they can take on multiple tasks at work and engage in frequent interpersonal relations with co-workers and clients. This seems logical, as the nature of engineering requires prospective students to be open to new ideas, technological innovations and new products. Engineers also deal with people in their daily job prescriptions and human encounters. Therefore, the personality test can be the primary assessment tool that may provide more insight into personal disposition in the selection procedure for engineering students at educational institutions.

## REFERENCES

1. Crites, J.O., *Vocational Psychology*. New York: McGraw-Hill (1969).
2. Holland, J.L., *The Self-Directed Search: Professional Manual*. Odessa: Psychological Assessment Resources (1985).
3. McCaulley, M.H., Macdavid, G.P. and Granade, J.G., ASEE-MBTI Engineering Consortium: report of the first five years. *Proc. ASEE Annual Conf.*, Atlanta, USA (1985).
4. Godleski, E.S., Learning style compatibility of engineering students and faculty. *Proc. Annual Frontiers in Educ. Conf.*, Philadelphia, USA, 362 (1984).
5. Mastor, K.A. and Halim, A.H., Personality and cognitive style differences among matriculation engineering and information technology students. *World Trans. on Engng. and Technology Educ.*, 3, 1, 101-104 (2004).
6. Costa, P.T.Jr and McCrae, R.R., Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual. Odessa: Psychological Assessment Resources (1995).

7. McCrae, R.R. and John, O.P., An introduction to the five-factor model and its applications. *J. of Personality*, 60, 175-217 (1992).
8. Lounsbury, J.W., Park, S-H., Sundstrom, E., Williamson, J.M. and Pemberton, A.E., Personality, career satisfaction, and life satisfaction: test of a directional model. *J. of Career Assessment*, 12, 4, 395-406 (2004).
9. Lounsbury, J.W., Loveland, J.M., Sundstrom, E.D., Gibson, L.W., Drost, A.W. and Hamrick, F.L., An investigation of personality traits in relation to career satisfaction. *J. of Career Assessment*, 11, 3, 287-307 (2003).
10. Mastor, K.A., Cooper, M. and Jin, P., Malay culture and personality. *American Behavioural Scientist*, 44, 1, 95-111 (2000).
11. Dollinger, S.M.C., Identity styles and the five-factor model of personality. *J. of Research in Personality*, 29, 475-479 (1995).