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Differences in Muslim Female Students Self-Concept between Engineering and Non-Engineering Courses in Polytechnic

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This study aimed to see if there were differences in self-concept for 300 Muslim female students in one of the selected Southern polytechnics through simple random sampling. The Tennessee Self Concept Inventory (TSCS) been used to measure self-concept. Data were processed with Statistical Package for Social Science (SPSS) version 25.0 and analysed using a descriptive and independent sample t-test. Findings revealed that there were significant differences between Muslim female students in engineering courses and non-engineering courses in the seven self-concept categories: overall self-concept ($p = 0.018$), moral and ethical self ($p = 0.002$), self-criticism ($p = 0.040$), self-esteem ($p = 0.028$), family self ($p = 0.026$), self-satisfaction ($p = 0.006$), and self-esteem ($p = 0.000$). While there was no difference in the other three self-elements namely physical self ($p = 0.837$), social self ($p = 0.681$) and self-identity ($p = 0.703$). Respondents of non-engineering courses have better self-concept than respondents of engineering courses except for self-identity. Both courses show that the best elements of self-concepts are self-identity while the weakest elements are self-critical. This study is significant to the polytechnic especially in strengthening the content of more self-directed programs in an effort to enhance the self-concept of Muslim female students in polytechnics.

Key words: *self-concept, female students, Muslim, polytechnic, engineering courses, non-engineering courses.*

Introduction

Women are people who are highly regarded in Islam. They play a very important role in the progress of the country. To complement the thinking of Adam, they need to be constantly supported in order to be consistently successful in life. However, one of the main things that can hinder a woman's success in her career is that she does not believe in her own abilities (Bushrah Basiron, 2006; Mwanja, Evusa & Ndirangu 2018). Some women fail to trust themselves. They often feel that something is too difficult for them to do. In the context of Muslim women, they face obstacles because their lives are essentially determined by their natural state. Previous research in Malaysia shows the interest towards resiliency and AQ in investigating how someone can face the adversities and challenges in their life (Khairani & Matore, 2017; Matore, 2019a, 2019b; Mohd Effendi Ewan Mohd Matore, Ahmad Zamri Khairani, Siti Mistima Maat, Nor Adila Ahmad, & Effa Rina Mohd Matore, 2018; Mohd Effendi Mohd Matore & Ahmad Zamri Khairani, 2016). Unfortunately, there is a lacking part in the research which is not focusing specifically on Muslim female students' focus groups especially in technical institutions.

The traditional norms and social attitudes were created by women who failed to develop their full potential (King Rohana Raja Mamat, 1991). There are some Muslim women who are overly sceptical of their own capabilities. Self-esteem theory states that women are more likely to ask questions because they are unsure of their own ideas, opinions and abilities (Abdullah Hassan and Ainon Mohd., 1997). In adolescence, we begin to wonder who we are. The question of who I am is one of the main issues that haunts youth (Arieff Salleh Rosman and Wardah Mokhtar, 2006). Teenagers are also concerned with their appearance and whether or not they are popular in school. As a result, they will avoid appearing in public or highlighting their activities. They often feel uncomfortable, cluttered, having poor communication skills, lacking in knowledge and so on. This condition can also be interpreted as inferiority complex. Students need to have a sense of self-awareness of who they really are.

Literature review

Self-concept is defined as how an individual interprets and evaluates his or her own behaviour and thoughts. Self-concept is known as an important agent that shapes the personality of the individual (Yusni Mohamad Yusop, Melati Sumari, Mohd Ibrahim K. Azeez, & Shahriza Said, 2015; Nair & Sinasamy 2017). Self-concept is also seen as the

extent to which individuals believe that they believe in self-worth and significance. In addition, this concept involves individuals' beliefs about themselves and their judgment of their own abilities, influence and popularity (Nalah, 2014; Mulyani, 2017).

There have been many previous studies on the concept of self-efficacy (Beheshtifar & Rahimi-Nezhad, 2012; Matovu, 2012; Wang, 2015; Yusni Mohamad Yusop et al., 2015). Previous studies have shown that their research is more focused on the relationship between self-concept and academic achievement (Ghazvini, 2011; Matovu, 2012; Tang, 2011). Most studies show that individuals with positive self-concept will produce good academic achievement or good performance. Previous studies have also focused on a range of target groups such as university and college students (Batican, 2011; Jamaludin Ahmad, Mazila Ghazali, & Aminuddin Hassan, 2011; Nalah, 2014), parents (Wang, 2015), students (Ayodele, 2011; Yusni Mohamad Yusop et al., 2015), as well as employees and organisations (Beheshtifar & Rahimi-Nezhad, 2012).

In producing highly skilled and capable technical workers, the focus on Public Skills Training Institutes (ILKA) such as polytechnics has become the government's top agenda. However, the low enrolment of female students in technical and engineering areas is a concern. Female students' enrolment in engineering is relatively low compared to male students. For example, the undergraduate enrolment in Manufacturing Engineering Technology (Automotive Design) with Honours in October 2016 was three female students compared to 27 male students. Similarly, in the field of electrical engineering, male students had 1047 enrolments compared to 216 female enrolments. In addition, mechanical engineering students also had a total of 2549 male and 673 female students (Polytechnic Education Department, 2016). These statistics reinforce the statement by Noor Sulastry Yurni Ahmad (2016) that the field of study that attracts male students is more focused on engineering, manufacturing and construction. Does this enrolment show that female students feel insecure and distrustful of their own abilities? Is societal scepticism or male domination an obstacle to their success?

Rohana Raja Mamat (1991) thinks that Malay women are facing a prejudiced and sceptical view of society in their ability to follow the male-dominated field. Malay women also face obstacles because women's lives are essentially determined by their natural culture. The traditional norms and social attitudes of the traditional people were created by these women who failed to develop their full potential. This is different from the scenario of Muslim female students in non-engineering fields in polytechnics such as trade, accounting and hospitality. The enrolment of female students is higher than male. They have no issues with self-esteem as they are in the realm of nature. However, the question arises as to whether the self-esteem of female students in the non-engineering field is as high as expected. Similarly, there were statistically significant differences in the self-concept of Muslim female students in both fields (Ngara, 2017). Therefore, this study will examine the level of self-concept of

Muslim female students for engineering and non-engineering courses in polytechnics. In addition, the foundation of the self-concept and the determination of whether there are differences in the self-concept of the two courses are also examined.

Very few studies have focused on studies on the self-concept of Muslim female as a whole in the local context. This study is relevant and significant given that the development of the field of self-concept science today is more focused on the concept of academic motivation. This study is also useful in providing insight into the current development of female students' self-concept with the aim of strengthening and producing students with confidence in facing technical challenges in Malaysia. In fact, Srivastava & Joshi (2014) show that individuals with high self-esteem have a sense of self-respect, high adaptability, initiative to connect with others and be active in social group activities. This comparative study is significant and meaningful in examining the patterns of self-concept among Muslim female students in polytechnics. They need guidance and empowerment to ensure that their confidence and confidence in their abilities is the same as that of other women. The idea behind this study is the need to prove that Muslim female students must believe that their involvement in engineering or technical fields has always been considered negative by society, not affecting their self-concept as a whole.

Research objectives

1. Determine the level of self-concept of Muslim female students in engineering and non-engineering courses from the categories of: total self-concepts, moral ethic self, self-criticism, personal self, family self, self-satisfaction, physical self, social self, self-identity and self- behaviour.

2. To rank the level of self-concept of Muslim female students in engineering and non engineering courses from total self-concepts, moral ethic self, self-criticism, personal self, family self, self-satisfaction, physical self, social self, self-identity and self-behaviour.

3. Determine whether there are differences in self-concept among Muslim female students in engineering and non-engineering courses for total self concepts, moral ethic self, self-criticism, personal self, family self, self-satisfaction, physical self, social self, self-identity and self- behaviour.

Methodology

Research design

This study uses a quantitative approach with surveys through written questionnaires. A quantitative approach was applied in this study because of its ability to collect and analyse numerical data for the purpose of explaining the phenomenon studied (Gay, Mills, & Airasian, 2012; Musti, 2016). The design of the surveys is well used because of its advantages in obtaining a generalizable sample in addition to the higher rate of return of the questionnaire (Kumar, Salim Abdul Talib, & Ramayah, 2013). The rate of return of this survey questionnaire was 100 percent, exceeding the amount suggested by Christensen, Johnson and Turner (2011). The interpretation of the mean range of this study is based on Landell (1997) with 1.00 to 2.33 as low, 2.34 to 3.67 as medium and 3.68 to 5.00 as high.

Sampling

The study population consisted of 1136 students comprising Muslim female students (Muslimah) in one of the Southern polytechnics. The table by Krejcie and Morgan (1970) found that the appropriate sample size for random sampling techniques was 291. Researchers consider that the best step is to use simple random sampling techniques by ignoring the school year. This is because the focus of this study is on the differences between the course and not the year of study. Thus, the researcher has conducted the study with a sample of 300 people. The selected non-engineering courses are Marketing, Accounting and Secretarial Science while selected engineering courses are Mechanical, Electrical and Civil Engineering.

Instrumentation

The measurement tools consisted of two parts, Section A and Section B. Section A was distinguished by the type of course (engineering or non-engineering courses) while Section B contained the same set of questionnaires for female students in both majors. Section A contains student information or background such as race, age, program, course and place of birth. Section B contains 100 questions from the Tennessee Self Concept Scale (TSCS) created by Fitts in the 1965. It was translated to Malay language by Sidek Mohd Noah (1995). The use of this test tool is very popular in the West as well as for the purpose of local studies to measure self-concept. The TSCS reliability of Fitts (1965) was 0.60 to 0.92 (N = 60), Morran and Stocktan (1980) in Kamaliah (1993) were 0.92. Kamaliah (1993) scored 0.66 (N = 40) and Norhayati (1994) in Effa Rina (1999) scored 0.7. According to Kamaliah (1993), the test results found that there is a correlation between the TSCS and proved the validity of the TSCS. There are five measurement scales used as 1 (Strongly agree), 2 (Disagree), 3 (Disagree), 4 (Agree) and 5 (Strongly Agree). Some items were re-encoded due to a negative item. Item reliability showed values greater than 0.7 as suggested by Hair, Celsi, Oritinau, & Bush (2013).

Data analysis

The analysis was performed by using the Statistical Packages for Social Sciences (SPSS) Version 25.0. The SPSS programming was chosen because it is suitable for analysing research data. Statistical methods used to analyse the data collected for this study were descriptive mean and t-test for two independent samples.

Results and discussion

Table 1 shows the mean-value comparison of the two different courses. Results revealed that respondents in non-engineering courses had a better self-concept than respondents in engineering courses. The exception was for the element of self-identity where engineering course respondents had a mean of 3.8857 compared to non-engineering course respondents who recorded 3.8709. However, both respondents for the different courses had low mean values for self-criticism. This is an exciting result to be discussed.

Table 1 : The Difference of Self-Concept Mean between Respondents of Engineering Courses with Non-Engineering Courses

Self-concept constructs	Engineering course	Non Engineering course
Personal self	3.6997	3.8056
Social self	3.3690	3.3849
Physical self	3.7346	3.7431
Total self concepts	3.5052	3.5843
Moral ethic self	3.5736	3.7208
Self-criticism	2.6595	2.7849
Family self	3.6190	3.7116
Self- behavior	3.3313	3.4708
Self-identity	3.8857	3.8709
Self-satisfaction	3.2884	3.4046

Table 2 shows the rank of self-concept for respondents in engineering courses. The best self-concept element for the engineering course respondents was the self-identity with a mean value of 3.8857, followed by the physical self with 3.7346 and the third highest element was the self-esteem of 3.6997. The lowest element of the self-concept is the self-criticism of 2.6595. This shows that the respondents did not criticise themselves. However, for the element of self-satisfaction, the respondents recorded only 3.2884 and the self-behavior was only in eighth place with a mean value of 3.3313. This explains that respondents have problems with their behaviors and aspects of self-satisfaction.

Table 2 : The Self Concept Rank for Engineering Course Respondents

Ranking	Self-concept constructs	Mean score
1	Self-identity	3.8857
2	Physical self	3.7346
3	Personal self	3.6997
4	Family self	3.6190
5	Moral ethic self	3.5736
6	Total self concepts	3.5052
7	Social self	3.3690
8	Self- behavior	3.3313
9	Self-satisfaction	3.2884
10	Self-criticism	2.6595

Table 3 shows the self-concept rank for non-engineering course respondents. The best self-concept element for non-engineering course respondents was the self-identity element with a mean value of 3.8709, followed by the self-esteem of 3.8056 and the third highest element was the physical self with 3.7431. The lowest element of the self-concept is the self-criticism of 2.7849. This indicates that the respondents did not criticize themselves and the decision was the same as that of the engineering course respondents.

Table 3 : The Self Concept Rank for Non Engineering Course Respondents

Ranking	Self-concept constructs	Mean score
1	Self-identity	3.8709
2	Personal self	3.8056
3	Physical self	3.7431
4	Moral ethic self	3.7208
5	Family self	3.7116
6	Total self concepts	3.5843
7	Self- behavior	3.4708
8	Self-satisfaction	3.4046
9	Social self	3.3849
10	Self-criticism	2.7849

However, the Social self element shows that the respondents recorded 3.3849 while the Self-satisfaction was in eighth place with a mean value of 3.4046. This explains that respondents may have problems with their level in their social environment and self-satisfaction. The obvious difference is that respondents in both courses have problems with their level of self-satisfaction.

The normality testing is required in order to test the difference between two independent groups. Because of this need to use a parametric test, an independent sample t-test was utilised. The kurtosis and skewness values indicated that the values are 0.856 and -0.175, respectively. In the field of social science and education, research data with skewness values and kurtosis between ± 2.0 are considered normal (Chua Yan Piaw, 2008; Garson, 2012; Lomax & Hahs-Vaughn, 2012). Even the findings of normality within the range of ± 1.0 are observed (Leech, Barrett, & Morgan, 2005). Therefore, t-tests for two independent samples can be used in the context of this study.

The study found that there were significant differences between Muslim female students in both engineering courses and non-engineering courses in the seven self-concepts as shown in Table 4. For overall self-concept (p = 0.018), moral and ethical self (p = 0.002), self-criticism (p = 0.040), self-esteem (p = 0.028), family self (p = 0.026), self-satisfaction (p = 0.006), and self-esteem (p = 0.000). While there was no difference in the other three self-elements, physical self (p = 0.837), social self (p = 0.681) and self-identity (p = 0.703).

Table 4 : Independent samples t-test for self-concept among Muslim female students for engineering and non-engineering courses.

Test	Levene's Test for Equality of Variance		T – test for Equality of Means			
Self-concept	F	Sig.	t	df	Sig. (2 – tailed)	Mean Difference
Total self concepts	0.864	0.353	-2.383	298	0.018*	-0.0791
Moral ethic self	0.000	0.995	-3.163	298	0.002*	-0.1472
Personal self	1.282	0.258	-2.206	298	0.028*	-0.1059
Family self	0.466	0.496	-2.235	298	0.026*	-0.0414
Social self	2.215	0.412	-0.412	298	0.681	-0.0159
Self-criticism	0.802	0.371	-2.058	298	0.040*	-0.1254
Self-identity	3.366	0.068	0.381	298	0.703	0.0148
Self-satisfaction	1.352	0.246	-2.745	298	0.006*	-0.1163
Physical self	0.903	0.343	-	298	0.837	-0.0084

			0.206			
Self- behavior	1.725	0.190	-3.981	298	0.000*	-0.1395

Conclusion and suggestions

This study has important implications for parents and society. Parents should be more aware of their daughters' needs and provide appropriate treatment to their souls and character. Parents should provide support and encouragement to their children in any type of course. Support from parents will strengthen their confidence to keep up with society's prejudices, their insecurities during the learning process and strengthen their sense of self-sufficiency. One of the important point when discussing the implications for society is to expect them to dispel prejudice against Muslim female students studying engineering. For increasingly challenging times nowadays, they are able to make a big contribution to the industry that was once dominated by men. Positive advice from the appropriate community will enable Muslim female students who are pursuing engineering courses to continue and maintain their rapport as Muslim female students despite being in the male community.

For Technical and Vocational Education, they should not have bias between male and female students. Such differences will further undermine the self-esteem of Muslim female students because it seems that their ability and credibility are disputed. Equal opportunities in the technical field need to be given fairly. Although the number of Muslim female students who attend the Technical and Vocational Education courses is larger, the reality is that when it comes to the real world of work, the numbers vary. Female students are sometimes excluded in some job aspects because the responsibility is felt to be better realized by male students. This is obsolete, but it still exists. Justice and equality are two different issues.

In the context of the study's implications for Technical and Vocational Education, what is emphasised is the justice in the implementation and distribution of responsibilities. The nature of Muslim female students self-restraint hinders them from doing so far from defining the Islamic feminine pattern globally. As the most responsible party, the Ministry of Higher Education can provide effective counselors to guide Muslim female students in leading their lives and learning. The counselors can focus directly on developing the self-concept of this female student. Effective and non-degrading student counseling will facilitate them to express their feelings that may not be understood by those closest to them. Their pessimistic outlook will change to be more optimistic view of themselves.

Implications for Muslim female students include their own awareness that the most important purpose of this life is to collectively contribute something useful to themselves, their families, religion, society and nation. They need to be able choose the right friends and refine

information wisely in terms of association or perception. Self-esteem is largely influenced by peers. Muslim female students can engage in community activities more often in their field. They need to take the opportunity to participate in any motivational and self-improvement program. A person's self-concept sometimes experiences a tide. Therefore, it is the student's responsibility to ensure that their strength of the self-concept will continue to be positive. As female students in the Polytechnic, they should make the negative community sense a catalyst for further advancement in male-dominated courses.

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