

# Accessing Gender Bias in Malaysian Secondary School Students' Leadership Inventory (M3SLI)

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## Background

In order to progress with the changing world, as well as to prepare for the future, the Ministry of Education (KPM) has introduced a new plan in 2012 called 'The Education Development Plan' (PPPM). This plan outlines the directions for the education system in Malaysia for 2013 until 2025. Through this plan, students are supposed to acquire six main attributes, namely thinking skills, knowledge, national identity, ethics and spirituality, bilingual proficiency and leadership skills (Ministry of Education Malaysia 2012).

According to PPPM, the education system helps every student reach his/her potential by creating formal and informal chances for the students to work in teams and to take on leadership roles. In PPPM, leadership encompasses four dimensions; namely, entrepreneurship, resilience, emotional intelligence and strong communication skills. Entrepreneurs take the initiatives to create and develop their own solutions are willing to invest their own resources and have the drive to see these through to the realisation of their aims (Ministry of Education Malaysia 2012). Resilient persons are able to develop constructive idea and are able to overcome obstacles. Emotionally stable persons have the ability to understand and work effectively with others. In addition, they can influence others positively. People who have strengths in communication skills have the ability to express their views and intentions clearly in oral and written form.

It is important to develop students' leadership and 'leadership identity' or sense of self to be able to lead (Renn and Ozaki 2010) during their school life to become

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future leaders. Amirianzadeh et al. (2010) view that leadership is considered as a part of lifelong learning and multidimensional construct involving competency, experiences and process. All adolescents possess leadership potential; 'today's young people are ultimately tomorrow's leaders' (Fertman and Van Linden 1999: 16). Furthermore, Bisland (2004) states that leadership development should begin as early as preschool or kindergarten. As students become older, leadership development should include exposure to and interaction with adult leaders in the community and region through mentorship and internships (Hine 2011). Leadership provides opportunities, stimulate motivation, and create goals to build capacity to promote the use of existing resources and the development of additional resources (Minckler 2011).

Intelligence, aptitude tests and school grades cannot necessarily predict the success of education and life. Instead, skills such as communication skills, patience and goal setting, should be taken into consideration (McClelland 1973). These skills can be developed through leadership development. The concept of leadership in this study refers to the competencies associated with personality and values as a student leader. Therefore, in leadership, personality development and self-esteem for a student should be emphasised. Some schools, especially boarding schools, give little emphasis on personal development and leadership coaching. The majority that provides these aspects do not pay attention in depth (Hassan and Safar 2010). Furthermore, student leadership is not specifically evaluated in schools in Malaysia.

In order to develop and plan a better training module, the schools need to know which specific areas to focus into. Good student leadership development programmes assure that the students not only gain optimum benefits from the training provided but also avoid unnecessary wastage of time and resources (Zakaria et al. 2008). As an effort to determine the student leadership competency profile, the purpose of this study is to develop a valid and reliable instrument to measure student leadership competency. This can help in the planning of programmes for intervention and improvement on students' leadership competency before the students enter higher level education or job market.

Besides, studies on the construction and validity of leadership instruments in Malaysia mostly lacked focus on items that may be bias (Mustamin 2013; Othman et al. 2014; Rosseni et al. 2009). Only some of the researcher were concerned about the biasness of the items (Haslina 2013; Zamru and Anisah 2012; Rahayah et al. 2010). To date, studies on biasness in instruments are less carried out in Malaysia.

Many previous research show differences in leadership role and leadership competency between male and female (Connerley et al. 2008; Farver 2007; Posner 2012). Paustian-underdahl et al. (2014) found that females were rated as significantly more effective than males. In different point of view, Johnson et al. (2008) argue that female leaders will be seen as effective when they show sensitivity and strength while male leaders just need to show strength. Connerley et al. (2008) suggest that although female leaders can be seen as having the same level of performance with male leaders, females are not seen as prepared as men leader at the same rate in international duties. However, Ismail et al. (2013) assert that leadership is not owned by a particular person or a particular gender.

Every instrument that is set to measure students' competency level especially those from multiple background and characteristics must be fair and equal (Rahayah et al. 2010). As an effort to ensure that the instrument is built for male and female students equally, gender differential item functioning (GDIF) is used to detect the possibility of any biased item. This study aims to evaluate the potential of measuring biasness between genders in the M3SLI. The potential biased items were investigated by conducting DIF analysis in Rasch.

## Methodology

A quantitative approach that involves the collection of data using survey was applied in this research. The 68-item Malaysian Secondary School Students' Leadership Inventory (M3SLI) based on Tubb's Model (Tubbs and Schulz 2006) was employed to gauge the three domains which comprises of personality (15 items), values (18 items) and competencies (35 items). The instrument was administered to 2340 students from 26 schools in four main divisions of Sabah. The respondents were all from government secondary schools within the state.

While analysing DIF, Bond and Fox Steps was used to perform two-tailed t-test to test the significant difference between two difficulty indices. Confidence level of significant was chosen at 95 % and the critical  $t$  value was set at  $\pm 2.0$  for all DIF analysis. Besides, DIF contrast was also used to determine the difference between item difficulties for the two groups. The size of DIF which is less than 0.5 logit or more than  $-0.5$  logit is negligible. DIF statistical significance is influenced by the size of DIF effect and the size of the classification groups but it is uninfluenced by the model fit (Linacre and Wright 2012). The indicators of DIF used were (1)  $t$  value  $\pm 2.0$  ( $t \geq +2.0 \leq -2.0$ ), (2) DIF contrast  $\pm 0.5$  (DIF Contrast  $\geq +0.5 \leq -0.5$ ) and (3)  $p < 0.05$  (Bond and Fox 2007).

## Psychometric Properties of Instrument

The reliability indices for personality, values and competencies are 1.00, 1.00 and 0.99, respectively, which is strong and acceptable because they are more than 0.8. The high item reliability might be due to the wide difficulty range of items and a large sample size. When the index is high, the sample size is enough for stable comparisons between items (Linacre and Wright 2012). The item separation index of M3SLI is 15.59, which is acceptable, based on Linacre and Wright (2012) that the separation index of more than 2 is good. High item separation ( $>3$ , item reliability  $> 0.9$ ) implied that the person sample is enough to confirm the item difficulty hierarchy, which is the construct validity of the instrument. The higher the number of separations, the more confidence the researcher can replicate the items across other samples (Linacre and Wright 2012). Besides, positive PTMEA Corr. indicates

that all the items are functioning towards a single measurement constructs. This is a fundamental step in determining the validity of the construct (Bond and Fox 2007). The PCAR analysis results show that the raw variance explained by measures of each sub-construct closely matched the expected target. The noise level of each sub-construct was acceptable because it was far from maximum of 15 % as recommended by Linacre (2003) and Fisher (2007).

## Findings and Discussions

In total, 2304 questionnaires were returned. 121 of them were incomplete and questionnaires with double responses were dropped. Hence, the total of respondents became 2183. The female respondents were 19.6 % more than the male respondents. These constitute a total of 877 male students and 1306 female students. Table 1 is a leadership competency profile of students by gender, which shows the mean percentage of female respondents had higher scores for all sub-constructs within the competence of the leadership than male respondents.

An analysis was carried out to study the existence of GDIF. By using Winsteps, two-tailed t-test was performed to analyse GDIF. At the 95 % confidence level, the critical  $t$  value used to determine the level of significance was 2.0. In this study, GDIF analysis show statistical significant differences between boys and girls based on the levels of difficulty of items (Table 2). A negative GDIF index indicates that an

**Table 1** Leadership competency profile by gender

Gender		Personality	Values	Competencies
Male	Mean	54.8425	58.8277	53.3145
	N	877	877	877
	S.D	6.71759	5.23824	4.97018
Female	Mean	54.9530	59.9988	53.8717
	N	1306	1306	1306
	S.D	5.82643	5.16579	4.75527

**Table 2** Significant GDIF based on gender in personality

Person class	DIF measure	Person class	DIF measure	DIF contrast	$t$	Name of item
1	0.33	2	0.46	-0.13	-2.49	CP1
1	0.19	2	0.37	-0.18	-3.49	CP2
1	-0.31	2	-0.46	0.15	2.68	CP4
1	0.50	2	0.36	0.14	2.71	CP7
1	0.53	2	0.70	-0.17	-3.45	CP9
1	0.12	2	0.26	-0.14	-2.75	CP11
1	-0.44	2	-0.71	0.27	4.82	CP14

item is easier to be agreed by the males and vice versa. GDIF directions can be seen in graphs (Figs. 1, 2 and 3) where the horizontal axis shows each item in the constructs studied, while vertical axis shows the level of difficulty item (DIF measure) for males and females. Item difficulty level of male students is represented by

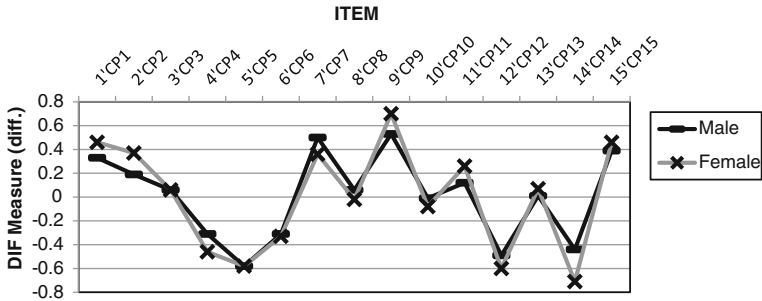


Fig. 1 GDIF plot of M3SLI (Personality)

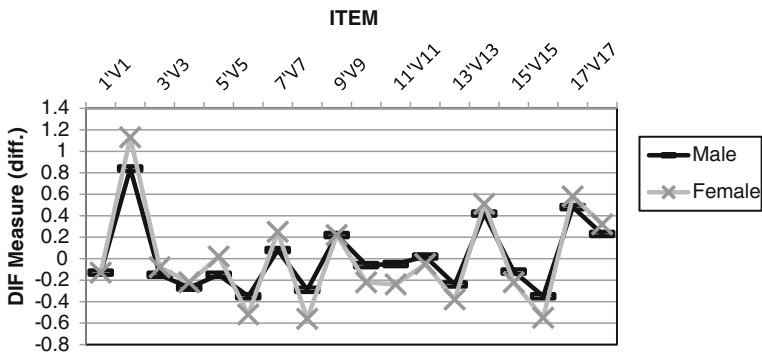


Fig. 2 GDIF plot of M3SLI (Values)

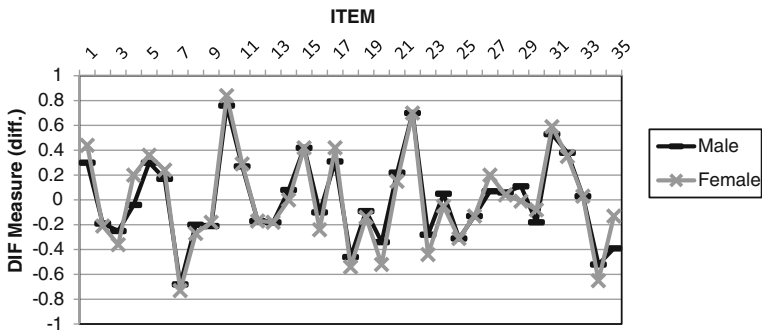


Fig. 3 GDIF plot of M3SLI (Competencies)

the symbol, while the girls are represented by the symbol **x**. Items that have a low level of difficulty in a group shows that the group is easier to agree with the item.

Figure 1 shows the DIF plot based on DIF measure for personality. Table 2 shows the results of GDIF analysis based on items in Personality construct. The analysed data demonstrates that seven items (47.7 %) from the 15 items in the personality construct show the significance of the GDIF in value  $t \geq 2.0$  logit. The items are CP1, CP2, CP4, CP7, CP9, CP11 and CP14. The GDIF contrast shows that the seven items do not show serious GDIF because less than 0.5 logit. When DIF size not more than 0.5, it can be neglected (Bond and Fox 2007).

Table 3 shows the results of GDIF analysis based on items in Values construct. The analysed data demonstrates that 13 items (72.2 %) from the 18 items in the values construct show the significance of the GDIF in value  $t \geq 2.0$  logit. The GDIF Contrast indicates that all the items do not show serious GDIF because is less than 0.5 logit. The items are V2, V5, V6, V7, V8, V10, V11, V13, V14, V15, V16, V17 and V18. Figure 2 shows the DIF plot based on DIF measure in Values.

Table 4 shows the results of GDIF analysis based on items in competencies construct. The analysed data shows that 11 items (31.4 %) from the 35 items show the significance of GDIF in value  $t \geq 2.0$  logit. The GDIF Contrast ( $\geq 0.5$  logit) shows that the 11 items do not show serious GDIF because the GDIF index is less than 0.5 logit. The items are LS1, LS3, LS4, LS16, LS17, LD20, LS23, LS27, LS29, LS34 and LS35. Figure 3 shows the DIF plot based on DIF measure in competencies.

As a summary, the result in Table 5 shows that out of the 31 items indicating the existence of LDIF, 14 items (45.2 %) were easier for urban area students, while 17 items (54.8 %) were easier for those from rural schools. There was a relatively large percentage in favour of both school locations in the measurement.

**Table 3** Significant GDIF based on gender in values

Person class	DIF measure	Person class	DIF measure	DIF contrast	$t$	Name of item
1	0.84	2	1.13	-0.28	-6.85	V2
1	0.15	2	0.02	-0.17	-3.84	V5
1	-0.35	2	-0.52	0.17	3.45	V6
1	0.08	2	0.25	-0.17	-4.07	V7
1	-0.29	2	-0.56	0.27	5.46	V8
1	-0.06	2	-0.22	0.16	3.52	V10
1	-0.05	2	-0.24	0.18	4.09	V11
1	-0.24	2	-0.38	0.14	2.96	V13
1	0.42	2	0.51	-0.09	-2.12	V14
1	-0.12	2	-0.22	0.09	2.04	V15
1	-0.35	2	-0.55	0.20	4.05	V16
1	0.48	2	0.58	-0.10	-2.59	V17
1	0.23	2	0.32	-0.09	-2.06	V18

**Table 4** Significant GDIF based on gender in competencies

Person class	DIF measure	Person class	DIF measure	DIF contrast	<i>t</i>	Name of item
1	0.30	2	0.44	-0.14	-2.81	LS1
1	-0.25	2	-0.36	0.11	2.18	LS3
1	-0.04	2	0.20	-0.24	-4.85	LS4
1	-0.10	2	-0.24	0.14	2.74	LS16
1	0.31	2	0.42	-0.11	-2.27	LS17
1	-0.34	2	-0.52	0.17	3.32	LS20
1	-0.28	2	-0.44	0.16	3.14	LS23
1	0.07	2	0.20	-0.13	-2.61	LS27
1	0.11	2	-0.01	0.12	2.47	LS29
1	-0.52	2	-0.65	0.13	2.46	LS34
1	-0.39	2	-0.13	-0.25	-4.98	LS35

**Table 5** Direction of GDIF

Construct	Item administrated	Item with <i>t</i> ≥ 2.0 logit	Direction of LDIF	
			Male	Female
Personality	15	7	3	4
Values	18	13	6	7
Competencies	35	11	5	6
Total	68	31	14	17

## Discussion

The study shows that there are significant differences between both genders in responding to the sub-constructs (core personality, values and personality) as the *t*-values were at ±2.0. In core personality, male respondents agree easily to CP1 (I can handle stress well) and CP11 (I am emotionally stable, not easily influenced by surrounding.). Male respondents feel stronger stress arising from family factor compared to female respondents (Kai-wen 2009). The result of this study is contradicted with the study of Jaafar and Hidayah (2013) which showed that female respondents were able to deal with stress more effectively than male. They claimed that the male respondents were more affected by stress and male students by far lose their patience easily when they faced problems. Besides, the male respondents were found to display more emotional inhibition and low emotional stability than their female counterparts (Budaev 1999; Matud 2004).

Besides, Kwon and Song (2011) found that extraversion was a male-specific trait while openness to experience was a female-specific trait. In this study, extraversion was a trait that was dominated by female students because female appear to agree more with item CP4 (I am a talkative person), CP7 (I am a reflective person), CP9 (I

am a sociable person.) and CP14 (I am considerate to others.) if compared to the male respondents. On the other hand, openness to experience was dominated by male students because male respondents replied positively when responding to CP2 (I always have new ideas) in this study.

Prochaska et al. (1992 cited in Quinn and Spreitzer 2006) state that value leads to a sense of personal growth and awareness that an individual is becoming the kind of person s/he wants to be in the context of leadership. Hofmann (2009) agrees that value systems are directly related to individuals' world views which primarily hold conscious beliefs about how things are or should be. There were six items in values construct that indicate advantage to male respondents. The items are V2 (Wealth), V5 (Friendship), V7 (Freedom), V14 (Power), V17 (Influence) and V18 (Status). This indicates that male respondents believe that wealth, friendship, freedom, power, influence and status are more important values in performing leadership tasks in comparison to female respondents.

Men tend to place themselves in the hierarchy and authority for the sake of rank and status while women tend to form groups and collect power as a support network (Fisher 2000). Biologically, this can be due to the testosterone factor in males which cause them to fight for the rank and status. They usually believe that influence is important to ask other people to move. In performing leadership tasks, male respondents also believe that friendship and wealth are important too because leaders are not able to work alone and organisations that they lead need financial input to run their activities. In schools, some activities in the organisations cannot be organised because of lack of financial resources. Male respondents are also more concerned about wealth. Different from male, females are more anxious of taking risks when it comes to money and prefer to stay loyal to their existing providers (Pine 2009).

On the other hand, female were more agree with seven items respondents: V6 (Independence), V8 (Justice), V10 (Self-Direction), V11 (Obedience), V13 (Family), V15 (Truth) and V16 (Protection). Men's sense of self-worth is derived from providing for and protecting their families (Birkby and Harmon 2002). Therefore, in performing leadership tasks, male respondents are more concerned about protection to family while female seek for self-protection. Biologically, the oestrogen factor in female produce nurturing and connecting behaviours. Thus, female believes that family is an important values in performing leadership tasks. Furthermore, they believe that obedience, truth and justice are important in performing leadership tasks to gain respects from their members. Although Jepsen and Rodwell (2012) support this claim and assert that justice has a diffuse effect for males, but not for females, in this study, justice affects females more than males.

Although in most parts of the country, female leaders are still far behind, there are more female leaders than ever before in the top leadership positions (Latu et al. 2013). Significantly, more females obtain supervision and middle management positions, but having said that becoming elite leaders or senior management is still relatively rare (Eagly and Karau 2002). In most setting, females possess lower level of status and power than male. This leads to the perception caused people to assume that males are more competent and knowledgeable than females (Carli 2001). Currently, it can be seen that female fight for and recognition for their roles in



society, including leadership. Besides, they also fight for recognition to prove that they can lead effectively. This indirectly inspires female students in high school to involve in leadership. Therefore, female respondents in this study easier to agree that independence and self-direction are important values in performing leadership tasks.

In competencies construct, there were six items which showed advantage to female respondents and five items to male. Within the six items, male respondents easier to agree that they are alert to the change of the global need (LS1), could handle their emotion well (LS4), show rather than tell the ways (LS17), could cope well with changes (LS27), and could solve problem well (LS35). Results of this study correspond to the study of Prime et al. (2009). They claims that male were more inclined towards action oriented, ‘take-charge’ leadership behaviours. Therefore, they suggested that male can solve problems better than females.

Prime et al. (2009) found that females were more effective than males at care-taking leadership behaviours. In line with that study, females in this study were easier to agree that they could lead according to situation (LS3), accept different types of idea from members (LS16), ready to change with the support of the members (LS20), could overcome obstacles patiently (LS23), could plan activities of my club/class together with the members (LS29) and ready to change with the support from my teachers (LS34). In other words, female respondents agreed that they could communicate better and leading changes with members in their organisations.

## Conclusion

As a summary, the items examined in three constructs tended to be bias towards female respondents. Overall, M3SLI shows 17 items bias towards females while 14 items bias towards males. Nonetheless, the contrasts between the groups were not serious as the GDIF index showed less than 0.5 logit. Therefore, all the items were maintained. DIF analysis is important to ensure that the instrument is valid and less biased to certain group of respondents. Through DIF, items with extreme levels of DIF were identified and omitted. Further studies are needed to understand the difference in DIF items according to the respondents’ grades, leadership posts and school locations.

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