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SELF-EVALUATION IN PROBLEM-BASED LEARNING

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Abstract

Problem-based learning (PBL) was introduced to the Faculty of Medicine, Universiti Kebangsaan Malaysia (UKM), in 1987. Since then, it has been improved and has become one of the faculty's main teaching and learning methodologies. Self-evaluation is one of the most important elements in PBL. Through self-evaluation, one is able to appraise one's own performance in terms of strengths and identify areas for improvement. However, developing the self-evaluation skill is difficult, and there are many factors that contribute to it. This study was designed to assess the self-evaluation skill and its contributory factors among 105 first-year UKM medical students. The level of self-evaluation skill was measured by mean marks discrepancies between the final marks given by students in their self-evaluation forms and those given by facilitators in their student evaluations over four modules in the first year. Students' perceptions of their self-evaluation skills were obtained via self-administered questionnaires. Results from this study revealed that female students have better self-evaluation skill (69%) than male students (62%), although female students tend to significantly underrate their performance while males overrate theirs. Furthermore, self-evaluation skill improves with time. In conclusion, female students are better than male students at self-evaluation.

Key words: problem-based learning, self-evaluation skill, gender, self-esteem

INTRODUCTION

Problem-based learning (PBL) is a student-centred learning strategy that encourages the development of reasoning, critical thinking, and communication skills among students (Williams and Beattie 2008). PBL was introduced to the Faculty of Medicine, Universiti Kebangsaan Malaysia (UKM), in 1987. However, it was not until 2005-2006 that PBL was adopted as the main teaching methodology; this was one of the changes implemented in the new integrated curriculum. Among the new elements introduced in PBL are the concept map, oral feedback, and self-evaluation. Self-evaluation is done at the end of a PBL session to assess students' performances. By evaluating themselves, students learn to develop their self-evaluation skill and more accurately assess their own abilities. Students' performances are also evaluated by

facilitators based on similar criteria and scale. Self-evaluation is the analysis of one's own strengths and weaknesses with the goal of self-improvement (Arthur 1995). This is an important tool for students to become life-long learners. Nevertheless, while the self-evaluation skill has proven effective in the student learning process, developing this skill is difficult and not often well done (Ward et al. 2002). Many factors contribute to self-evaluation skills: gender, self-esteem, duration of learners' exposure to self-assessment activities, and so on. Self-evaluation skill could also be affected by intellectual ability, which is reflected in students' academic performances (Widanski and Nash 2004, Pallier 2003, Gordon 1991). Individuals with good self-evaluation skills have better awareness of their own abilities, and are able to maintain their strengths and correct their weaknesses. With a continuous effort toward self-improvement, they are able to perform well, and this gives them confidence to perform better in the future.

This study was designed to determine some of the factors contributing to self-evaluation skill. The null hypotheses of this study are that there is no gender difference in self-evaluation skill and that there is no relationship between the duration of practising self-evaluation and self-evaluation skill.

MATERIALS AND METHODS

This study was approved by the faculty of the Research and Ethical Committee. A retrospective study was carried out over a period of 10 months from September 2008 until June 2009 at Universiti Kebangsaan Malaysia (Kuala Lumpur campus). The target population consisted of 227 first-year UKM medical students (batch 2007-2008). Several exclusion criteria were established, including incomplete self-evaluation forms, incomplete student evaluation forms, incomplete survey on self-evaluation forms, and students in batch 2007-2008 who repeated their first year. After excluding those students who did not fit the criteria, the total sample size was 105.

There are eight modules in the first year, with four modules in each semester. In this study, self-evaluation skill was measured based on students' performance in four out of eight modules, two from the first semester (the first and third) and two from the second (the fifth and seventh). In each module, there were three or four PBL cases. Data were taken based on the average score of each module. Research tools used in data collection were the self-evaluation form, the student's evaluation form, and the survey on self-evaluation form. There are five components in the evaluation forms:

- (i) Punctuality
- (ii) Ability to communicate and team skills
- (iii) Understanding of knowledge
- (iv) Ability to think critically
- (v) Ability to perform tasks

A score from 1 to 5 was given for each component, with an accompanying rubric to describe each level. Students were required to fill in the self-evaluation form at the end of each PBL session and score their performances in each component during the PBL session. Facilitators also assessed the students' performances in PBL using a similar form. The final mark was obtained by a summation of the scores in all five components. The final mark given by the facilitator is regarded as the gold standard. All facilitators in the faculty are required to attend a prerequisite two-day course in facilitation before they conduct a PBL session (Nabishah et al.,

2010). The evaluation forms used for self-evaluation and the forms used by the facilitators to evaluate the students are similar.

Self-evaluation skill was measured by the discrepancy between the final marks given by students and facilitators in the self- and student evaluation forms, respectively, in four modules (cellular bio-molecules, membrane and receptor, metabolism, and mechanism of disease). Based on students' responses, a survey on the self-evaluation form was conducted to identify to what extent students understood the items in the self-evaluation form. This self-administered questionnaire consists of 11 items, with scores ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was validated by an earlier study on patient health in this region (Azah et al., 2005). The survey on self-evaluation forms was distributed to second-year students at the end of the second semester of examination.

Analysis of data was done using SPSS (version 12.0). Gender difference in self-evaluation skill was analysed using a Student *t*-test. Time was defined as the duration from the first module in the first semester (cellular biomolecules) until the seventh module in the second semester (mechanism of disease). A linear regression test was used to analyse the relationship between time and self-evaluation skill.

RESULTS

Out of 227 first-year students (batch 2007-2008), 122 students were excluded from this study due to various criteria, leaving 105 students included in the analysis. A negative mean marks discrepancy indicates students who scored themselves lower than their facilitators did; a positive mean marks discrepancy indicates students who scored themselves higher. Among 105 students, 34 (32.4%) were male and 71 (67.6%) were female. This ratio of male and female students is reflective of the overall student population, which is 30:70 male to female.

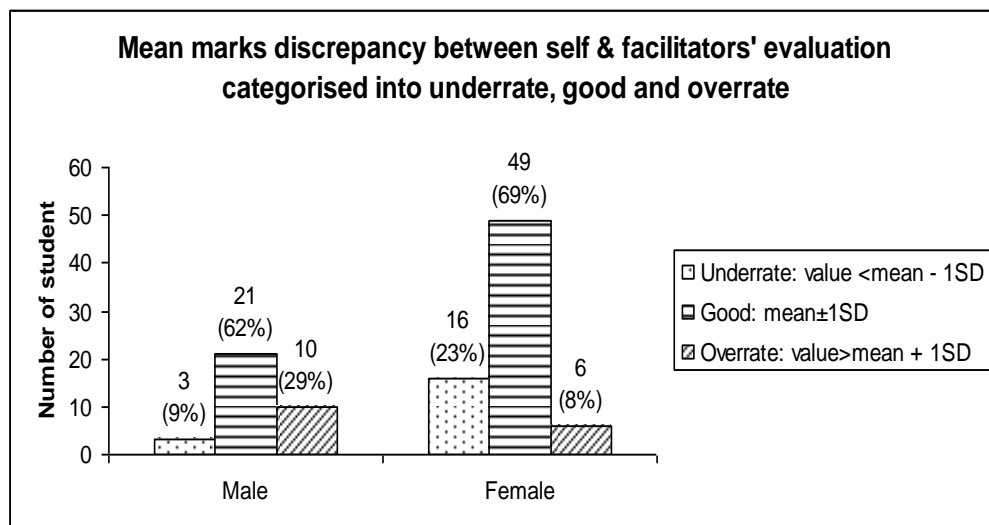


Figure 1 Mean marks discrepancy between self- and facilitator evaluations categorised into underrated, good, and overrated

Figure 1 shows the mean marks discrepancy between self- and facilitators' evaluations, categorised into underrated, good, and overrated. The categories were derived by dividing the

mean marks discrepancy between the self- and student evaluations. Categories were determined by dividing the evaluations evenly into three groups. Those with a mean marks discrepancy less than mean-SD (-3.67 to -1.49) were regarded as underrating themselves, those within 1 SD from the mean (-1.48 to +1.48) were regarded as having good skill, while those with a mean marks discrepancy more than mean-SD (+1.49 to +3.44) were those who overrated themselves.

Between genders, a higher percentage of females (69%) than males (62%) belonged in the 'good self-evaluation skill' category. This gender difference, in terms of the ability to self-evaluate, is significantly different ($p = 0.0045$), taking the facilitator score as the gold standard. The results show that a greater percentage of male students (29%) than female (8%) overrate themselves. In contrast, more female students (23%) than male (9%) underrate themselves. A Student's t -test was used to analyse the relationship between gender and self-evaluation skill. It revealed that there was a statistically significant difference in self-evaluation skill between males and females ($F = 0.229$, $t = 3.629$, $df = 103$, $p = 0.000445$). Additionally, females had a smaller mean marks discrepancy (-0.35 ± 1.41) than males (0.69 ± 1.28).

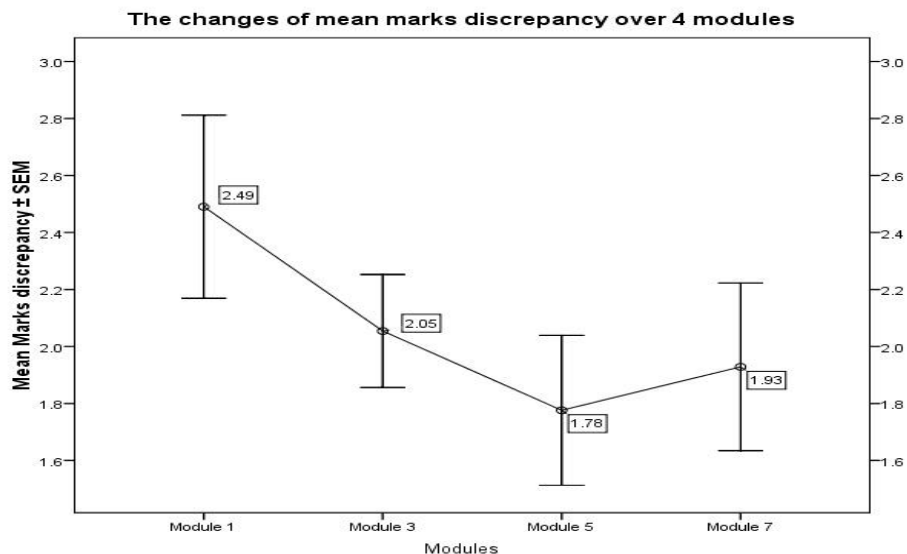


Figure 2 Relationship between mean marks discrepancy and time

In Figure 2, the mean marks discrepancy in the first module is 2.49 ± 1.65 . It decreased to 2.05 ± 1.02 in the third module after the students had been exposed to eight PBLs. The mean marks discrepancy decreased further to 1.78 ± 1.35 in the fifth module. Although there was an increase in mean marks discrepancy from the fifth to the seventh module (1.93 ± 1.51), the increment was not significant when statistically tested using a Student t -test ($p = 0.441$). A linear regression test showed a negative and linear relationship between mean marks discrepancy and time ($p = 0.001$). The linear equation is $\text{mean marks discrepancy} = 2.55 - 0.196 (\text{time})$. This indicates that the students' self-evaluation skills improved over time.

From the survey on self-evaluation form, 72% of the respondents agreed that the feedback from the facilitators was helpful in improving their self-evaluation skill (Table 1). More than half the students understood the importance and purpose of the self-evaluation forms (65% and 71%, respectively). A majority of students agreed that they understood every component in the self-evaluation, especially the punctuality component (55% of them 'strongly agreed'). About 73% agreed that they were honest in evaluating their performances in PBL most of the time.

Significantly, 61% of students agreed that the self-evaluation form helped them identify their own strengths and weaknesses in PBL and improve their performances in the future.

DISCUSSION

This study showed a gender difference in self-evaluation skill. Hence, the null hypothesis is rejected. Female students have better self-evaluation skills compared to male students (see Figure 1). Female students tend to underrate their performances during PBL, as they generally gave themselves lower marks than those given by facilitators (mean marks discrepancy = -0.35 ± 1.41). In contrast, male students overrate their performances (mean marks discrepancy = $+0.69 \pm 1.28$). This result is supported by previous studies (Widanski and Nash 2004, Pallier 2003, Kardash 2000). Males and females were found to begin the process of learning with similar levels of confidence in their skills (Knight et al. 2002). However, as time progresses, females may experience an erosion of confidence, which can be a reason why they tend to underrate themselves. This loss of confidence is believed to be due to females' higher anxiety levels; they also tend to be more sensitive. Therefore, they were more influenced by their surroundings than males (Broverman et al. 1972). Thus, when females are given negative feedback, they are more likely than males to become more upset and angry, thereby rejecting the feedback. In contrast, attributes like autonomy and assertiveness were more highly associated with males (Lundgren and Rudawsky 1998). Facilitators should be aware of this significant difference in self-evaluation between genders and their differing responses to feedback. With this in mind, facilitators can plan different approaches when supervising students of each gender. Based on the results, males have poorer self-evaluation skills than females. Therefore, facilitators should offer greater assistance to male students in self-evaluating their performances. On the other hand, as females' self-confidence may be more fragile and they may be more sensitive to negative criticisms, facilitators should provide them with constructive feedback and be careful not to be unduly negative or demoralizing. In conclusion, different approaches to supervising each gender are crucial, since males and females respond differently.

A linear regression test showed a significant difference in students' self-evaluation skills over time ($p = 0.001$). Hence, the null hypothesis was rejected. The mean marks discrepancy decreased to a level that is not significantly different from facilitators' scores by the fifth module in the second semester of the first year. Thus, students' self-evaluation skills improved over time; this finding is supported by other studies (Woolliscroft et al. 1993, St-Pierre 2004). Self-evaluation is one of the skills that can be improved when students gain experience in evaluating their abilities. The improvement of self-evaluation skills among the students was due to their gaining of experience in self-evaluation as they progressed from the first module to the last in the first year. Self-evaluation is a complex skill that must be learned and practised over time (St-Pierre 2004). Apart from experience and training, feedback from facilitators is also crucial for the development of this skill. The survey on the self-evaluation form has shown that 72% of the respondents agreed that the feedback from the facilitators was helpful in improving their self-evaluation skills. Early introduction of self-evaluation is helpful in the development of students' self-evaluation skill (St-Pierre 2004). For this reason, we suggest that a formal training programme can be provided to equip all students with the skills to self-evaluate. The survey administered to determine students' perceptions of their self-evaluation revealed that 41% of females disagreed with the statement that they underrate themselves, while 44% of males disagreed with the statement that they overrate themselves (see Table 1).

Table 1 Survey on the self-evaluation form conducted among 105 students. Results are expressed in percentages.

Scale: 1 (strongly disagree) to 5 (strongly agree)

Items	Scale	1	2	3	4	5
I understand the importance of the self-evaluation form.		3%	7%	29%	50%	11%
I understand the purpose of the self-evaluation form.		2%	6%	25%	52%	15%
I understand the components of the self-evaluation form:						
Punctuality		0%	5%	10%	30%	55%
Ability to communicate and team skill		0%	2%	20%	45%	33%
Understanding of knowledge		0%	5%	21%	45%	29%
Ability to think critically		1%	2%	24%	49%	24%
Ability to perform tasks		2%	6%	16%	51%	25%
I am honest in evaluating my performance in PBL most of the time.		0%	4%	14%	56%	26%
The self-evaluation form helps me to identify my own strengths and weaknesses in PBL and improve my performance in the future.		3%	6%	30%	47%	14%
I tend to overrate myself intentionally.		M:32%, F:32%	M:12%, F:31%	M:35%, F:30%	M:21%, F:7%	M:0%, F:2%
I tend to underrate myself intentionally.		M:26%, F:21%	M:21%, F:39%	M:35%, F:40%	M:15%, F:18%	M:3%, F:1%
I do not know how to evaluate myself.		24%	39%	23%	7%	7%
I know how to evaluate myself accurately.		5%	14%	44%	31%	6%
There is feedback from facilitators after every PBL.		5%	22%	42%	26%	5%
Feedback from the facilitators is helpful in improving my self-evaluation skill.		2%	3%	23%	46%	26%

These findings are not consistent with the actual scores shown in Figure 1. This can be explained by students' lack of awareness of their own abilities while evaluating themselves. They may have subconsciously and unintentionally overrated or underrated themselves, which indicates poor self-evaluation skill. The conflicting results can be further explained by the

grading of students on the statement, 'I know how to evaluate myself accurately'. A majority of students (44%) marked '3' on the 5-point scale, which may mean that they were unsure. This doubt about their ability to self-evaluate might have caused them to overrate or underrate themselves unintentionally. In fact, 42% of students were unsure that there was feedback from facilitators after every PBL. The possible reason for this is that facilitators were inconsistent in giving feedback. In addition, 11 of the students suggested that facilitators give comments on their performances in PBL, which indicates that not all facilitators have fulfilled their responsibilities in giving feedback.

Based on this study, female students have better self-evaluation skills than their male counterparts. Time and experience are other factors essential to developing the skill; this was demonstrated by the overall improvement of self-evaluation skill over the course of the year.

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