Understanding Students Performance based on Gender and Types of Schooling using SEM

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Abstract

The paper looks into student achievement based on gender and type of schools. Learning styles and learning strategies were investigated as factors contributing to the differences in academic achievement among boys and girls in single gender and co-educational schools. Learning Styles and Learning Strategy Inventories were distributed to 400 students. Structural Equation Modeling found a good fit between the model with the data of samples. This study also found that academic achievement is directly influenced by learning strategies. The findings of this study provide a new dimension in explaining the growing gender gap in Malaysian educational system.

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Keywords: Learning style; Learning strategies; Gender; Type of school; Students achievement

1. Introduction

In Malaysia, one of the implications of female dominance in academic achievement is a disparity in the number of male and female students in the public universities. In fact, similar underachievement of boys than girls is also ubiquitous abroad (Zalizan et al., 2001; Zalizan et al., 2005; Mc Kenna, 1997; Younger et al., 2005). As such, Malaysian Ministry of Education has taken several positive steps to improve the academic performance of boys in primary and secondary schools, as well as in tertiary education centers (Zalizan et al., 2001; Zalizan et al., 2005). Review of the results of public examinations such as UPSR, PMR and SPM in Malaysia showed girls overcome boys in most subjects. For example, at the primary level, although the number of boys who sat for UPSR is more than the number of girls, the percentage of female students who passed the exam is still higher in all subjects (The Malaysian Examination Board 1996-2007). Furthermore, SPM results from 1996 to 2007 also show that female students achieve better than male students in the majority of subjects, including core subjects such as Malay, English, Science and Mathematics. Since the SPM is the main determinant of eligibility to enter universities, the low achievement of boys in this public examination is one of the main factors that deny them opportunities and may lead to further disparity in the number of male and female students at the university.
Therefore, as long as the academic achievement gap between boys and girls is still significant, the issue is still relevant and important to be studied, while efforts should be enhanced to understand the phenomenon and to find and recommend measures for improving the performance of boys.

2. Statement of the Problem

Individual differences such as gender and academic achievement affect student's learning styles and strategies (Hyland 1993). Each individual has their own unique learning style and personality and different ability to experience the learning process. Ingham (1992) and Dunn (1990) states that every teacher should understand and appreciate their student differences. Teachers should be aware of these differences as a unique privilege instead of weakness of the student while teaching in the classroom (Sternberg, 1997; Riding & Rayner, 2002).

Based on the reviews of the literature, most studies conducted in Malaysia explore the factors affecting student achievement in public schools, boarding schools, religious schools and technical schools (Zalizan et al., 2001; 2005; Nolia et al., 2006; Poh & Ng, 2008). Whereas, research involving single gender and co-educational schools is less studied. Thus, the selection of gender and type of school (single gender and co-educational school) can provide an initial overview of the local phenomena as well as additional data on the achievement relationships using a student population at the secondary school level. Factors affecting the achievement of boys and girls at these types of school, particularly student’s learning styles and strategies should be studied. Therefore, this study aims to examine the relationship between learning styles and learning strategies with academic achievement of boys and girls according to the type of schools attended by them.

3. Research Objectives

The main focus of this study was to examine the relationship between learning styles, learning strategies and academic achievement among students. Structural Equation Modeling (SEM) technique is used to examine the direct effects of learning styles and learning strategies towards the achievement in each core subjects, simultaneously. Furthermore, studies on these two factors (learning styles and learning strategies), which is expected to affect the student’s performance, would allow researcher to build a model or to recommend approaches to help improve the academic achievement of boys and girls.

The study was conducted specifically to investigate the relationship between gender, type of school, learning styles, learning strategies and student achievement in Malay, English, mathematics and science.

4. Sample and Sampling Method

A total of 400 boys and girls from two single gender schools and two co-educational schools in Pahang, Malaysia were selected using a stratified random sampling method presented by Krejcie and Morgan (1970). The purpose of sampling was to obtain a group of respondents who were able to represent the whole population without any bias (McMillan, 1992; Hair et al., 2006).

5. Research Instrument

The instrument used to measure learning styles was the Learning Style Analysis (LSA-Senior: Dunn & Prashnig, 2000), which is specifically designed for secondary school students. There are 196 items in the LSA and it consists of six domains in the theory of learning styles, as in Keefe (1987) and Dunn (2000); environment, attitudes, social, sensory modality, physical and brain dominance. Back translation method as proposed by Brislin (1970) was used in translating the questionnaire. Language learning strategies questionnaire (Mohamed Amin, 1996) was used to measure language learning strategies used by students in the subjects of Malay and English. This questionnaire contains 62 items. To measure the learning strategies of mathematics and science, the instruments used were a modified version from the study of Zalizan et al. (2001), and it contains 24 items.

6. Data Analysis

Data were analyzed using AMOS version 16. A confirmatory factor analysis of learning styles was used to examine the extent to which the domain of the construct of learning styles and learning strategies and academic
achievement is supported by data from the population being studied. In addition, according to Stapleton (1997), confirmatory factor analysis can also be used to determine the reliability and validity of each construct in the study.

Structural Equation Modeling was used to estimate the measurement model of learning styles and learning strategies, showing three latent variables; learning styles, learning strategies and academic achievement, and fourteen measured variables that serve as an indicator to all latent variables. The endogenous variables were learning strategies and academic achievement, and learning styles were the exogenous variable.

7. Findings and Discussions

7.1 Relationships between learning styles, learning strategies and academic achievement by gender and type of school

The Structural Equation Modeling analysis showed a good fit between the model with sample data. The value of $\lambda^2/\text{df} = 1.511$ is greater than 1 but less than 5. Root Means Square of Error Approximation (RMSEA) = 0.036 is less than 0.08. Meanwhile, the Comparative Fit Index (CFI) = 0.926, Tucker Lewis Index (TLI) = 0.907 and Incremental Fit Index (IFI) = 0.929 show values greater than 0.90. This model has achieved the threshold values for the model fit.

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Notes:
$\beta$ = Beta standard (Standardized Regression weights)
* = Significant at the .05 level

The analysis shows that the learning strategies of boys and girls in single gender school have a significant relationship with academic achievement ($\beta=.253$, $t=1.969$, $p=.049$; $\beta=.293$, $t=2.334$; $p=.020$ where $p<.05$). The learning styles of boys and girls in the single gender schools and female students in co-educational schools are found to have a significant relationship with learning strategies ($\beta=.424$, $t=2.333$, $p=.020$; $\beta=.356$, $t=2.490$; $p=.013$; $\beta=.320$, $t=2.172$, $p=.030$ where $p<.05$). Meanwhile, learning strategies are not significantly related to the achievement of boys and girls in co-educational schools. The analysis also shows no significant relationship between learning styles and learning strategies for boys in co-educational schools. However, there is indirect relationship between learning styles and academic achievement via learning strategies for boys and girls in single gender schools. Furthermore, overall contribution of the model to academic achievement based on type of schools is estimated using Squared Multiple Correlation ($R^2$). The value for $R^2$ was .093 for male student achievement and .076 for female students of the single gender schools. For male and female students of co-educational schools, the $R^2$ values were .011 and .040, respectively. So, the overall contribution of all variables (learning styles and strategies), associated with the achievement, were 9.3 percent for boys in the single gender school, 7.6 percent for girls in the single gender school, 1.1 percent for boys in co-educational schools and 4 percent for girls in co-educational schools. Next, the size effect for the achievement of boys in the single gender school was found to be moderate, and the others were relatively small.

With reference to Table 1, the relative contribution of each variable by gender and type of school shows that learning strategies contribute significantly to the prediction of achievement for boys and girls in single gender schools. Factor analysis of learning strategies on the achievement of female students of the single gender school
(β=. 293, t=2334, p=.020) were larger than those of male students at the single gender school (β=.253, t=1969, p=.049). The relative contribution of learning styles factors on learning strategies was found to be significant for boys (β=.424, t=2.333, p=.020) and girls (β =.356, t=2.490, p=.013) of single gender schools and for girls of co-educational schools (β =.320, t=2.172, p=.030). This means that in terms of relative contribution, learning styles provide greater positive contribution to learning strategies for boys at single gender school.

8. Discussions

Learning strategies of boys and girls in single gender schools have a significant relationship with academic achievement. This means that their achievement is influenced by the strategies used in the classroom, outside the classroom and during examination. Hence, the learning strategies used by students when studying certain subjects should be strengthened to provide maximum impact on student’s academic achievement, especially for male and female students at single gender schools.

Learning styles of boys and girls in single gender schools and female students in co-educational schools also have a significant relationship with learning strategies. In other words, boys and girls who use preferred learning style will impact or influence their learning strategies when studying. Therefore, male and female students at single gender schools could be encouraged to use their preferred styles while learning, which in-turn can create more positive learning strategies to help improve their academic performance.

Learning strategies are not significantly related to the achievement of boys and girls in co-educational schools. This means that the academic achievement of boys and girls in co-educational schools is not affected by which learning strategies they use. This scenario may be caused by other factors which are not being studied in this study, such as motivation, socialization and the school environment.

In addition, results of analysis also reveal that there is no significant relationship between learning styles and learning strategies for boys in co-educational schools. This means that the learning styles of boys in this type of schools have no impact on their learning strategies.

Apart from that, this study shows that there is no direct relationship between learning styles and learning strategies for the achievement of boys and girls in single gender schools. It was found that learning styles do not affect the academic achievement of boys and girls in co-educational schools. This means that the learning styles of boys and girls in the single gender schools affect academic performance through learning strategies. Students need to learn to use their preferred learning styles as they can influence the selection of the right learning strategies while learning, leading to better achievement of boys and girls in single gender schools.

This scenario can be attributed to the trend of lower academic achievement of boys and girls in single gender schools than student’s achievement in co-educational schools. If the teachers and school administrations in a single gender schools are aware of their student’s learning styles and learning strategies, the academic performance of their students can be enhanced. Therefore, the teachers, especially in all boys’ schools, should modify their learning styles and strategies by taking into account the diversity of their student’s learning styles and strategies.

9. Conclusions & Implications of the Study

The results of this study indicate that learning strategies have an impact on student’s academic achievement. Learning styles, on the other hand, only have an indirect impact on achievement through learning strategies. This means that students who use their preferred learning styles will choose more positive learning strategies, which eventually can help them improve academically.

The study also found that learning strategies has greater effect on the performance of students from single gender schools than co-educational schools. This may be due to students of single gender schools are more comfortable and learning strategy oriented. This study provides significant contribution in education so that to the diversity of students in the classroom can be identified and comprehended. Learning styles and learning strategies, which have significant relationships with academic achievement based on gender and type of schools, can help teachers explore new teaching practices that are more creative and innovative. These findings help teachers to be more concerned with the diversity of learning styles and strategies without losing sight of boys or girls. In addition, schools can also use these findings as a basis for planning in-service training programs for teachers. Students are able to identify their strengths and weaknesses in learning if they can adapt to positive learning styles and learning strategies.
References


