Comparison of Science Performance among male and female Iranian eighth grades students

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ABSTRACT

The main objective of the present study is to explore the comparison of male and female science performance. The participants in the study consisted of 680 lower secondary school children, 14 year olds (317 male and 363 female) at Tehran and Shahriar city, the province of Tehran, Iran. The research design was an ex-post facto and tested the alternative hypothesis. The students’ science performance which measured by the report school test was used to assess science performance. Descriptive statistics, and to compare male and female students in science performance ANOVA was used. The results showed that there is no significant difference between male and female students in science performance. This study supports the new findings that girls perform better than boys in science subject and has resulted in larger mean score in girls in science performance rather than boys.

Introduction

Student achievement in the twenty first century demands a new rigor in student science knowledge, since advances in science and technology require students to think and act like scientists. As a result, students must acquire proficient levels of knowledge and skills to support a knowledge base that is expanding exponentially with new scientific advances (Wiggins, 2006). Meanwhile, there is a wide gap in the science performance of males and female students in eighth grade. Although the performance by females in upper level occupations and positions in science has expanded in recent years, science is still considered a masculine career field (Vockell & Lobonc, 1981).

There are a number of studies pointing to a correlation between students’ science performance and gender differences (Erickson & Farkas, 1991; Beaton, et al., 1996; Dimitrov, 1999; Martin, et al., 2000; Bacharach, et al., 2003; Von Secker, 2004; Chang, 2008; Preckel, et al., 2008; Sahranavard, et al., 2012a). Some of studies have shown that boys outperformed girls in science achievement, such as, the relationship of gender and science achievement show that boys in general tend to perform better than girls (Comber & Keeves, 1973; Erickson & Farkas, 1991; Martin, et al., 2000). Other studies (such as Dimitrov, 1999; Bacharach, et al., 2003; Von Secker, 2004) indicate that gender is another factor which influences science achievement in boys to generally perform better than girls in science. However, a few recent studies (such as Chang, 2008) conducted within racial or ethnic groups show that the gender differences in the upper and lower levels of study deserved continued investigation. At lower levels of study, the average performance of girls was better than boys and had smaller score variation. At the upper levels, boys outperformed girls and had larger variance. In addition, boys outnumbered girls in the top 25% in science performance. Later, Postlethwaite and Wiley (1992) find gender differences on standardized achievement scores for 24 countries which participated in The Second International Science Study (SISS). In another study using the National Assessment of Educational Performance (NAEP) dataset, Schibeci and Riley (1986) find gender differences in achievement and attitudes, with girls scoring lower in both. In addition, Rosier and Banks (1990) report that the results of SISS in Australia revealed that the average science achievement of 10 and 14-year-old male students were significantly higher than that of female students of the same age Chang (2008), meanwhile, indicates that students’ background factors, such as gender and performance in science. Similarly, parental expectations for their progeny’s future careers mirrored gender typing. Male students were encouraged to pursue technical careers in the hard sciences while female students were directed towards fields in literature (O’Connor-Petruso & Miranda, 2004).

There are studies that show no significant difference in science achievement between male and female students (Chang, 2008; Ghaderi, et al., 2009; Sahranavard, et al., 2012b), while Several other studies also show girls outperforming boys in...
science (Honour, 1997; Bacharach, et al., 2003). Using data from the First International Science Study (FISS), Comber and Keesee (1973) show that girls consistently performed less well than boys in science.

Science performance scores were also found to be significantly correlated to the general academic climate subscale of expectation, whereas social studies performance scores were correlated to the general academic climate subscale of order—meaning that the general academic climate is linked to student achievement (Sumner, 2006). Another study (Honour, 1997) related to science performance revealed that gender outcomes demonstrated that females outperform males in all achievement categories except standardized testing, with a consequent potential gender bias which may affect science opportunity for females. This gender bias refers to the performance expectations from relevant parties are not prevalently directed at males but favor females, although males are significantly more responsive to such support than females; that school support and related activities are not significantly predictive of academic success nor of major academic choice; and that females are more likely to enter the biological sciences while males are more likely to enter the physical sciences or computer sciences and engineering.

Based on to above mentioned and importance of gender in science performance, this study generalized this information to specifically Iranian eighth grade lower secondary school students. Some studies obtained similar results and the other studies were showed different results. This study determined whether, the gender can influence on science performance among Iranian eighth grade lower secondary school students.

Material and Methods

Sample
The sample for this study is selected from the total population of Eighth Grade students in lower secondary schools from large community schools in Tehran city as urban and Shahriar as suburban and the rural areas of Shahriar, during the academic year of 2010/2011. For the present study, stratified sampling was used, and therefore the sample of this study involves two centrally-located school districts among 21 districts of Tehran with 120 male and 160 female students, and also Shahriar lower secondary schools with 202 male and 198 female students.

Procedure
Data was collected by students who achieve science scores in Eighth Grade sampling as measured by the report school test in 2010/2011 academic year, Iran.

Measures
According to Bandura (1997), special attention should be paid to the real performance of students while assessing students’ achievement. The real performance of the students is manifested when the task is important to them and when they are highly motivated to take part in it. Students’ science performance was measured by the science performance test which is one of the tests is held in the end of each cycle for entrancing to upper cycle in Iranian schools.

Moreover, this test administers for all of Iranian students generally and simultaneously, in eighth grade guidance schools in end of academic years. As a result, in the present study the students’ scores on the science test administered at the end of 2010-2011 academic years were collected from the school records and served as the basis for judging students’ science achievement. This test is of utmost importance to the students (Kabiri & Kiamanesh, 2004).

Results
Data was analyzed by using statistical package for social sciences (SPSS 18.0). Besides descriptive statistics, ANOVA was also used in this study.

Descriptive statistics
A perusal of table 1 reveals that the mean scores on science performance for male students are 14.2177 with the SD of 3.15. Also the mean scores on science performance for female students are 14.8158 with the SD of 3.08.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>364</td>
<td>5.28</td>
<td>20.00</td>
<td>14.8158</td>
<td>3.14884</td>
</tr>
<tr>
<td>Male</td>
<td>316</td>
<td>5.28</td>
<td>20.00</td>
<td>14.2177</td>
<td>3.07823</td>
</tr>
</tbody>
</table>

ANOVA
To compare male and female students in science performance, ANOVA (Analysis of Variance) was used. First, the important assumptions for the method such as, normality and equality of variance matrices were investigated.

The results of normality show the distribution of science score in boy and girl groups have normal distribution, but, the results of Shapiro Wilk show that all variables in two groups have normal distribution.
Table 2. The Results of Kolmogorov-Smirnov Test for Investigation of Normality of Science Score in Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Kolmogorov-Smirnov</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td>Science Score</td>
<td>boy</td>
<td>.140</td>
</tr>
<tr>
<td></td>
<td>girl</td>
<td>.129</td>
</tr>
</tbody>
</table>

Discussion

The results of the study showed that there is difference between male and female students in science performance. This result is in line with other studies show that boys outperformed girls in science achievement (Comber & Keeves, 1973; Erickson & Farkas, 1991; Martin, et al., 2000).

Nonetheless, the other study is opposite with the results of the study such as, (Beaton, et al., 1996; Honour, 1997) that female students outperform male students science performance. Hence, how gender contributes to differences in students' science performance remain in conclusive.

Conclusion

The results indicated that there is no statistically significant difference between boys and girls in science performance, however, in the science performance; the mean of the girls group is more than the boys. Perhaps this finding supports the old finding that, girls perform better in the courses related to physics and its worthy performance has been reflected in their science performance and has resulted in larger mean score in girls in this student’s science performance rather than boys. Implication of the study was derived from the fact that student’s science performance is important indicators for quality learning outcomes. Future research should examine whether the present findings generalize to other samples and settings.

Acknowledgments

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References


O’Connor-Petruso S, Miranda K. 2004. Gender inequalities among the top scoring nations, Singapore, Republic of Korea, and Chinese Taipei, in Mathematics achievement from the TIMSS-R study IRC2004 - TIMSS.


Sumner MG. 2006. Climate and student performance in Tennessee middle schools. The University of Tennessee

