International Journal of Multidisciplinary Education and Research
ISSN: 2455-4588; Impact Factor: RJIF 5.12
www.educationjournal.in
Volume 2; Issue 2; March 2017; Page No. 01-05

Effect of gender and nationality on achievement of secondary school students of India, Pakistan and Zimbabwe

Ambalika Dogra

Ph.D Scholar, Department of Education, Panjab University, Chandigarh, Punjab, India

Abstract
This paper aims to investigate the effect of gender (male & female) and nationality (India, Pakistan & Zimbabwe) on achievement of secondary school students in science and mathematics based on annual final assessment taken by the respective education boards of the participated countries. The achievement data (n=6000) for session 2012-2013 was gathered manually in 2013 from the participated schools of all the countries where each country contributed 2000 sample of students gathered from 20 schools. The statistical tests such as t-test and analysis of variance was applied for analyzing the data and results of the study indicated that no significant differences exist on the achievement of students in science or mathematics in terms of gender in India, Pakistan and Zimbabwe indicates dilution of gender disparity in these three countries. Besides, nationality of the students has influenced their achievements both in science and mathematics because both male and female students of India achieved more in science and mathematics than students of Pakistan or Zimbabwe. In addition, students of Pakistan achieved more than students of Zimbabwe as they were the least achievers. Therefore, nationality had a significant effect on the achievement of students. The reason most likely is the economy of country which play a significant role in promoting schools, teachers and students' achievement. Although, economic status or type (public or private) of the school was not examined which can provide new insights into the influence of nationality on students' achievement.

Keywords: Gender, nationality, achievement, secondary school students.

1. Introduction
The achievement of students particularly those who belong to k-12 is very significant for any country. As this strata of students have utmost potential, rising level of intelligence and their growing mind which can contribute a lot to the economy of country. However, there is an achievement gap with respect to gender in many areas. It is also generally said that female school students are more efficient in reading and writing skills than their male counterparts. Although, this gap is not prominent till 4th grade and it starts appearing after this grade when female students have been observed to achieve more marks in their writing and ability test. Besides, it is same for students of any nationality such as USA, UK, India, Pakistan or South Africa. The point here this study wants to highlight is that achievement gap in Science or Mathematics is not a good sign for any country. Female students perform well till 4th grade either in Science or Mathematics, but, their performance starts declining in higher grades such as in 9th or 10th standard (Zembar & Blume, 2011). Hence, due to their average performance in these subjects, they are least interested in pursuing higher education in Science or Mathematics. Moreover, this is the reason that there are less number of women in discoveries related to Science or Mathematics although many women have started pursuing engineering or other technical courses these days, but, nonetheless, this gender or achievement gap in terms of Science or Mathematics is still existing.

Also, Zembar and Blume (2011) [7] stated that both males and females perform well in basic mathematics knowledge, however, total achievements of male is higher in mathematics than females and moreover, female adolescents indicates poor mathematical reasoning skills than males. This achievement gap is a matter of great concern because less females are entering into the profession of engineering which is diluting the diversity in this profession. Contribution of female in science or mathematics is essential as it can lead to more discoveries and thus more development. It is imperative here to study the cause of this achievement gap which still exists in Science or Math and this paper has studied differences of secondary school students in Science or Math with respect to their gender and also in terms of nationality to see if particular nation also have this achievement gap or if nationality influences achievement?

2. Objectives
The present study was done to achieve the following objectives:

1. To study and compare mathematics achievement of male and female students studying in schools of Zimbabwe.
2. To study and compare achievement in science of male and female students studying in schools of Zimbabwe.
3. To study and compare mathematics achievement of male and female students studying in schools of India.
4. To study and compare achievement in science of male and female students studying in schools of India.
5. To study and compare mathematics achievement of male and female students studying in schools of Pakistan.
6. To study and compare achievement in science of male and female students studying in schools of Pakistan.
7. To study and compare mathematics achievement of male students studying in schools of India, Pakistan and Zimbabwe.

8. To study and compare achievement in science of male students studying in schools of India, Pakistan and Zimbabwe.
9. To study and compare mathematics achievement of female students studying in schools of India, Pakistan and Zimbabwe.
10. To study and compare achievement in science of female students studying in schools of India, Pakistan and Zimbabwe

3. Review of the literature

3.1 Gender, Nationality and Students' achievement

In 2010, Lindberg, Hyde and Peterson found that males and females performed equal in mathematics after doing meta-analysis of 242 studies published between 1990 and 2007. Quest, Mineo and Higgins (2013) [5] found that male and female adolescents performed equal in math and science while Asian-American students performed better in math and science than White, African-American and Latino students. After Eshetu (2014) [2] analyzed gender disparity in English and Math achievement in higher education preparatory schools at Ethiopia. The results of the study signified statistical significant differences in favor of males who showed higher achievement than females. Jensen and Stanat (2016) [3] studied achievement and motivation in Mathematics and Science in terms of gender and immigration background. The results indicated negligible gender differences. On the contrary, Baye and Monseur (2016) [1] examined gender differences in reading, science and mathematics in an international context from 1995 to 2015 and it was found that performance of males was highest in science and mathematics than females. Besides, Thien (2016) [6] explored performance of Malaysian students in mathematics literacy from gender and socioeconomic status perspectives and found that girls significantly performed better in mathematics than boys.

The above reviewed studies indicate that males have performed better in science or math than females in most of the studies, however, one findings in 2016 gave antagonistic results as females performed better while few other studies stated no significant differences in males or females. In terms of nationality, most of the studies explored differences in terms of ethnicity from one country only and merely one study has explored achievement data of students from various countries (Bay and Monseur, 2016) [1], but they studied achievement in terms of gender only. This mixture of findings in terms of gender gap in achievement stimulate enough to further investigate it. In terms of nationality, none of the previous study has explored achievement of students, so present research probed achievement gap of secondary school students in terms of their gender who belong to India, Pakistan and Zimbabwe.

3.2 Problem and Significance of the Study

The conclusion of the findings above reveals the certainty of doing more research on the student achievement in terms of gender and nationality. Besides, there is a lack of research done on the influence of nationality on achievement of male and female students simultaneously from many countries particularly from India, Pakistan and Zimbabwe. So far, no previous research has examined these three countries such as India, Pakistan and Zimbabwe. Therefore, investigator of the present study decided to investigate the influence of gender and nationality on students' achievement among three countries.

The findings of the study would contribute to the knowledge of how achievement of students is influenced by their gender and also with respect to their nationality (India, Pakistan and Zimbabwe). The study would also unearth the differences in achievement of students in the significant subjects such as Science and Math among India, Pakistan and Zimbabwe and this study would dig out if gender disparity is still existing (in comparison to the old cliché that male students perform better in science or math) in these three countries with respect to the achievement of students in Science and Mathematics.

4. Hypotheses

1. There is no significant difference in mathematics achievement of male and female students studying in schools of Zimbabwe.
2. There is no significant difference in achievement in science of male and female students studying in schools of Zimbabwe.
3. There is no significant difference in mathematics achievement of male and female students studying in schools of India.
4. There is no significant difference in achievement in science of male and female students studying in schools of India.
5. There is no significant difference in mathematics achievement of male and female students studying in schools of Pakistan.
6. There is no significant difference in achievement in science of male and female students studying in schools of Pakistan.
7. There is no significant difference in mathematics achievement of male students studying in schools of India, Pakistan and Zimbabwe.
8. There is no significant difference in achievement in science of male students studying in schools of India, Pakistan and Zimbabwe.
9. There is no significant difference in mathematics achievement of female students studying in schools of India, Pakistan and Zimbabwe.
10. There is no significant difference in achievement in science of female students studying in schools of India, Pakistan and Zimbabwe

5. Method

5.1 Research Design

The ex-post facto research method was used with causal comparative design and independent variables of the study were gender (male & female) and nationality (India, Pakistan & Zimbabwe), while dependent variable of the study was achievement of students in Science and Mathematics which is assessed by Public Board of each country at the commencement of the academic session. Achievement data was gathered manually from all selected school of the countries.

5.2 Sample

The sample of the study was collected country wise by employing random sampling technique from one district of each country. From India, a union territory: Chandigarh was chosen purposively as a place for collecting sample. Then 20 schools were selected by random sampling technique and achievement data of students belong to 9^{th} and 10^{th} standard

was collected from the respective schools in Science and Mathematics at the end of academic session (2012-2013) while the data was gathered in 2013 on the basis of final exam scores achieved by students and these scores are assessed and declared by Central Board of Secondary Education (CBSE) India. Likewise, similar kind of data was gathered from Punjab Province of Pakistan and Mashonaland Province of Northern Zimbabwe from their respective schools. A total of 60 schools and 6000 9th and 10th grade students participated in the study from all the countries where a sample of 20 schools and 2000 students were collected from each of the country.

6. Discussion of Results

The results of the study were discussed as per the objectives and hypotheses of the study. The hypotheses of the study were tested under the following sub-headings:

6.1 There is no significant difference in mathematics achievement of male and female students studying in schools of Zimbabwe

The first objective of the study was accomplished and t-test was applied to test the null hypothesis which indicated no significant difference in mathematics achievement of male and female students studying in schools of Zimbabwe [t= 0.852 (1994), α=0.394 > .05 level of significance, (Table 1)]. Therefore, null hypothesis is accepted which stated no significant differences in achievement of male and female students of Zimbabwe.

Table 1: Descriptive and t-ratio of mathematics achievement of male and female students of Zimbabwe

Math Achievement	N	Mean	Standard Deviation	t-ratio	Sig.
Male	880	48.44	22.82	0.852	0.394
Female	1116	47.57	22.37		
Total	1996				

Table 1 indicates that male and female students of secondary schools of Zimbabwe had equal achievement in the subject of mathematics. The result of this study indicates that there are no achievement differences in terms of gender as both achieved equally in schools of Zimbabwe.

6.2 There is no significant difference in achievement in science of male and female students studying in schools of Zimbabwe.

The null hypothesis was also accepted as no significant differences were found in achievement in science of male and female students studying in schools of Zimbabwe [t= 0.562 (1994), α=0.574 > .05 level of significance, (Table 2)].

Table 2: Descriptive and t-ratio of science achievement of male and female students of Zimbabwe

Science Achievement	N	Mean	Standard Deviation	t-ratio	Sig.
Male	880	48.44	22.82	0.562	0.574
Female	1116	47.57	22.37		
Total	1996				

6.3 There is no significant difference in mathematics achievement of male and female students studying in schools of India

The third null hypothesis was also accepted as no significant differences were found in mathematics achievement of male and female students studying in schools of India [t= 0.760 (1998), α=0.448 > .05 level of significance (Table 3).

Table 3: Descriptive and t-ratio of mathematics achievement of male and female students of India

Math Achievement	N	Mean	Standard Deviation	t-ratio	Sig.
Male	904	64.31	14.05	0.760	0.448
Female	1096	63.83	14.05		
Total	2000				

Table 3 shows that male and female students of India had equal achievement in the subject of mathematics which is similar to the result obtained from Zimbabwe schools.

6.4 There is no significant difference in achievement in science of male and female students studying in schools of India

The fourth null hypothesis was accepted as no significant differences were found in science achievement of male and female students studying in schools of India [t= 0.751 (1998), α=0.453 > .05 level of significance (Table 4)].

Table 4: Descriptive and t-ratio of science achievement of male and female students of India

Science Achievement	N	Mean	Standard Deviation	t-ratio	Sig.
Male	904	63.61	12.40	0.751	0.453
Female	1096	64.04	13.07		
Total	2000				

Table 4 shows that male and female students of India had equal achievement in the subject of science as well which is similar to the result obtained from Zimbabwe schools in terms of the subject science.

6.5 There is no significant difference in mathematics achievement of male and female students studying in schools of Pakistan

The fifth null hypothesis was also accepted as no significant differences were found in mathematics achievement of male and female students studying in schools of Pakistan [t= 0.379 (1998), α=0.705 > .05 level of significance (Table 5)].

Table 5: Descriptive and t-ratio of mathematics achievement of male and female students of Pakistan

Math Achievement	N	Mean	Standard Deviation	t-ratio	Sig.
Male	889	59.01	15.69	0.379	0.705
Female	1111	59.28	15.63		
Total	2000				

Table 5 shows that male and female students of Pakistan do not differ significantly in terms of achievement in mathematics.

6.6 There is no significant difference in achievement in science of male and female students studying in schools of Pakistan

The sixth null hypothesis was accepted because no significant differences were found in science achievement of male and female students studying in schools of Pakistan [t= 0.165 (1998), α=0.869 > .05 level of significance (Table 6)].

Table 6: Descriptive and t-ratio of science achievement of male and female students of Pakistan

Science Achievement	N	Mean	Standard Deviation	t-ratio	Sig.
Male	904	63.61	12.40	0.165	0.869
Female	1096	64.04	13.07		
Total	2000				

Table 6 shows that male and female students of Pakistan had equal achievement in the subject of science as well which is similar to the result obtained from students of Pakistan and Zimbabwe in terms of the subject science as well as in mathematics.

6.7 There is no significant difference in mathematics achievement of male students studying in schools of India, Pakistan and Zimbabwe

The null hypothesis was rejected as significant differences were observed on achievement in mathematics of the male students belong to India, Pakistan and Zimbabwe [F= 178.33 (2/2670), α=0.00 < .05 level of significance (Table 7)]. After post hoc analysis by Scheffe test, it was found that performance of male Indian students in mathematics was better than students of Pakistan as well as Zimbabwe while male students of Pakistan achieved more than students of Zimbabwe.

Table 7: Descriptive statistics and F-value of India, Pakistan and Zimbabwe on male students' mathematics achievement

Math Achievement	N	Mean	Standard Deviation	F-value	Sig.
India	904	64.22	14.30	178.33	.00
Pakistan	889	59.01	15.69		
Zimbabwe	880	48.44	22.82		
Total	2673				

6.8 There is no significant difference in achievement in science of male students studying in schools of India, Pakistan and Zimbabwe

The null hypothesis was rejected as significant differences were observed on achievement in science of the students belong to India, Pakistan and Zimbabwe [F= 220.237 (2/2670), α=0.00 < .05 level of significance (Table 8)].

Table 8: Descriptive statistics and F-value of India, Pakistan and Zimbabwe on male students' science achievement

Science Achievement	N	Mean	Standard Deviation	F-value	Sig.
India	904	63.61	12.40	220.237	.00
Pakistan	889	57.39	14.75		
Zimbabwe	880	47.40	21.03		
Total	2673				

It was observed after post hoc analysis that Indian male students' achievement in science were better than students of Pakistan as well as Zimbabwe. Moreover, male students of Pakistan achieved more in science than students of Zimbabwe. It indicates that male students of the three countries are achieving different in mathematics and science.

6.9 There is no significant difference in mathematics achievement of female students studying in schools of India, Pakistan and Zimbabwe

The null hypothesis was rejected as significant differences were observed on achievement in mathematics of the female students belong to India, Pakistan and Zimbabwe [F= 247.64 (2/3320), α=0.00 < .05 level of significance (Table 9)].

Table 9: Descriptive statistics and F-value of India, Pakistan and Zimbabwe on female students' mathematics achievement

Math Achievement	N	Mean	Standard Deviation	F-value	Sig.
India	1096	63.83	14.05	247.64	.00
Pakistan	1111	59.28	15.63		
Zimbabwe	1116	47.57	22.37		
Total	3323				

Post hoc analysis reveals that Indian female students achieved better in mathematics than students of Pakistan as well as Zimbabwe. Besides, female students of Pakistan achieved more in mathematics than students of Zimbabwe, but not more than female students of India.

6.10 There is no significant difference in achievement in science of female students studying in schools of India, Pakistan and Zimbabwe

The null hypothesis was rejected as significant differences were observed on achievement in mathematics of the female students belong to India, Pakistan and Zimbabwe [F= 299.78 (2/3320), α=0.00 < .05 level of significance (Table 10)].

Table 10: Descriptive statistics and F-value of India, Pakistan and Zimbabwe on female students' science achievement

Science Achievement	N	Mean	Standard Deviation	F-value	Sig.
India	1096	64.04	13.07	299.78	.00
Pakistan	1111	57.51	15.28		
Zimbabwe	1116	46.88	20.61		
Total	3323				

Post hoc analysis reveals that Indian female students achieved better in science than students of Pakistan as well as Zimbabwe. Furthermore, female students of Pakistan achieved more in science than students of Zimbabwe, but not more than female students of India.

7. Conclusion, Limitations and Suggestions

This paper employed descriptive method to present the existing situation where achievement of secondary school students was studied in science and mathematics in terms of gender and nationality and only three countries were chosen to study the problem. More countries should be explored for studying gender differences and achievement data of the students can be retrieved from the public websites whereas for the present study, data was gathered manually because students' achievement data for the particular school especially private one is not available on the public websites. Therefore, three districts from three countries were chosen purposively while 20 schools from each country were chosen by employing random sampling technique. Future studies should be carried out on large sample by including other districts from each of the country as no significant differences were observed on students' achievement with respect to their gender which indicates interesting and good results while signifying that male and female are equal achievers both in science and mathematics which terminate gender disparity among these three countries (Lindberg, Hyde & Peterson, 2010; Quest, Mineo & Higgins, 2013; Jensen & Stanat, 2016) [4, 5, 3]. In terms of nationality, significant differences were seen on achievements of students as Indian students have achieved

better than Pakistan and Zimbabwe in science and mathematics while students of Zimbabwe were the least achievers. The interaction effect of gender with nationality could give some more clues about the achievement differences, however, this is one of the limitation of this study as interaction effect between these two factors was not observed. Another limitation is the influence of type (private & public) of school was not studied on students' achievement of all the countries as it presumably effects their achievement. This study has not identified the reason because of its descriptive nature as why nationality is the cause of achievement differences? It is most likely because of the economy of country as India is economically better than Pakistan or Zimbabwe. However, it needs to be examined if economy of the country plays any role in enhancing achievement of students or is it an economic status of the particular school?

8. Acknowledgement

I appreciate Dr. Aisha Siddiqui from Pakistan, Justin Gwembire from Zimbabwe and Dipanshu Sharma from India for collecting data for this study.

9. References

1. Bay & Monseur (2016). Gender differences in variability and extreme scores in an international context. *Large-scale Assessments in Education*. doi: 10.1186/s40536-015-0015-x
2. Eshetu (2014). Gender disparity analysis in academic achievement at higher education preparatory schools: Case of South Wollo, Ethiopia. *Educational Research and Reviews, 10* (1), 50-58. Retrieved on December 29, 2015, doi: 10.5897/ERR2014.1975
3. Jansen & Stanat (2016). Achievement and motivation in math and science: The role of gender and immigration background. *International Journal Gender, Science and Technology, 8* (1). Retrieved July 16, 2016 from http://genderandset.open.ac.uk/index.php/genderandset/article/viewArticle/414
4. Lyndberg, Hyde & Petersen (2010). New trends in gender and mathematics performance: A meta-analysis. *Psychol Bull, 136* (6), 1123-1135. Retrieved on August 12, 2015, doi: 10.1037/a0021276.
5. Quest, Mineo & Higgins (2013). Math and science attitudes and achievement at the intersection of gender and ethnicity. *Psychology of Women Quarterly*. Retrieved on June 5, 2016, doi: 10.1177/0361684313480694. 2013.
6. Thien (2016). Malaysian students' performance in mathematics literacy in PISA from gender and socioeconomic status perspectives. *The Asia-Pacific Education Researcher, 25* (4), 657-666. Retrieved June 25, 2016 from http://link.springer.com/article/10.1007/s40299-016-0295-0. doi: http://dx.doi.org/10.1007/s40299-016-0299-9.
7. Zembar & Bloom (2011). Gender and academic achievement. Retrieved February 15, 2015 from http://www.education.com/reference/article/gender-academic-achievement/