Journal of Elementary Education
Volume 29, No. 2, pp. 1-14

Girls Underperforming in Science: Evidences from Khyber Pakhtunkhwa, Pakistan

Raza Ullah[*], Hazir Ullah[**] and Tim Allender[***]

Abstract

Evidences from Khyber Pakhtunkhwa Pakistan show girls' out-performance and boys' under-performance in school and colleges level examinations. Despite of girls' outstanding performance in school and college examination, they are not catching up with boys in science subjects in terms of achieving high grades. This paper aims to unpack the prevailing reasons of girls' under-performance in science subjects in elementary, secondary and higher secondary schools examinations in the capital city of Peshawar- Khyber Pakhtunkhwa (KP). It focuses on girls' underperformance in Elementary, Secondary School Certificate and Higher Secondary School Certificate Annual examinations of the Board of Intermediate and Secondary Education (BISE) Peshawar, KP. The article uses secondary and primary data. The secondary data consist of results records of BISE, Peshawar KP and primary data come from qualitative interviews with 20 school and college teachers (10 males & 10 females). The selection of teachers was done with the help of purposive sampling technique. The study comes up with diverse explanation for girls' underperformance and boys' outperformance in science subjects. The explanation encompasses the traditional beliefs in science subjects as masculine domain, gender stereotypes among parents, teachers, and the gendered belief about jobs opportunities available to boys and girls in socio-cultural context of KP. The findings of the study recommend that girls can do well in science subjects if they are given favorable and conducive environment.

Keywords: Education, outperformance, purposive sampling, science, thematic analysis

[*] PhD Scholar, Sociology, International Islamic University, Islamabad.
Email:razaullahkhan01@gmail.com
[**] Associate Professor, Sociology, Quaid-I-Azam University, Islamabad.
Email: hazirullah@qau.edu.pk
[***] Professor, School of Education and Social Work, The University of Sydney, Australia.
Email:tim.allender@sydney.edu.au

Introduction

Khyber Pakhtunkhwa is one of the four provinces of Pakistan, situated in northwestern region of the country alongside international boarder of Afghanistan. Gender disparities in the province are clearly visible in almost all spheres of life. Like other aspects, gender inequality in education is also prominent. For instance, the number of educational institutions for male students is much higher than female students. The total number of schools is 37,988. Out of these, there are 27,207 public schools with a total enrollment of 3,763,796 pupils both male and female. The private schools in the province are 6,101 with about 1,304,099 pupils and 4,680 are either Deeni Madaris or community run and operated schools enrolling approximately 200,185 pupils (Shams, 2017). Shams (2017) found that the total number of schools is 28,178 public schools with 17649 boy's schools and 10,529 girls' school. He further states that the total number of colleges in Khyber Pakhtunkhwa is 158 (94 colleges for male and 64 for female). Moreover, formally, students in the province (KP) attend private or public schools. It is necessarily to mention here that despite of the above mentioned schools and colleges, all are not functional to receive students. Keeping such inequalities in view, the gender reversal change (girls do well) in education in the province Khyber Pakhtunkwa is interesting. Despite of girls' good performance in examinations, they are not catching up boys in science subjects in Khyber Pakhtunkhwa. It is worth considering argue that like other societies, empirical evidences are lacking on underperformance of girls in science. However, some small scale studies confirms girls' underperformance in mentioned domain (Aslam, 2009).

It could be argued that despite the lack of formal research based studies, the under-performance of girls in school and college examinations have been a topic of discussion in newspapers. For example, in 2015, the observer newspapers have only focused and highlighted the trend of girls' outperformance and boys' underperformance in SSC and HSSC examinations without deeper analysis into the reasons for this remarkable phenomenon. It is thus, claimed that no article has inquired the reasons and factors of girls under-performance in science subjects in the context of Khyber Pakhtunkhwa. It is therefore, argued that the issue of girls underperformance is largely ignored area in the context of Pakistani society. The current article not only examine the performance of girls and boys across different subjects but also attempts to explore the reasons of girls' underperformance in science subjects. We do believe that the current study will throw extremely important reasons of girls' underperformance in science and will fill the gap in the scholarship in Pakistani context.

Review of Literature

Gender gap favoring girls has been witnessed in education across the globe. A substantial body of literature is available on the issue of this gender reversal change throughout the world (Machin & Pekkarinen, 2008; Ullah & Ullah, 2019). However, it is pertinent to mention here that boys have historically dominated girls particularly in math, physics and technological subjects across the globe with the exception of few developed countries (Alexander, 2016). There are rich evidences that worldwide boys be likely to perform better than female students in the subjects categorized as science subjects (Baker & Jones, 1993). Boys are surpassing girls in the subjects of natural sciences, especially physics and math (Perez-Felkner, Nix & Thomas, 2017). Sinnes (2006) asserted that boys outdoing girls in physics and mathematics in the school and college levels' examinations. Based on his study findings, he claimed that this trend has been increasing over time. Nonetheless, boys' performance is tenuous in Arts and humanities subjects (Bedard & Cho, 2010; Charles & Luoh, 2003). The under representation of girls in the subjects of science and math and boys in humanities is a world-wide phenomenon (Burke & Mattis, 2007; Ceci & Williams, 2011; Cheryan, Ziegler, Montoya & Jiang, 2017). They key findings of their studies the performance gap in some countries such as United States, Swedish and United Kingdom is narrow, however, it is wide in the rest of the countries. Girls performance have been catching up with boys in the science subjects in west (Baker & Jones, 1993; Hedges & Nowell, 1995). Thomson, Hillman, Wernert, Schmid, Buckley and Munene, (2012) highlighted that in in their study that the findings of one of the recent studies, such as the Trends in International Mathematics and Science Study (TIMSS), confirmed gender parity in the educational performance of boys and girls of the 22 out of 42 countries in the subjects of science and math. Machin and Pekkarinen (2008) asserted that the gap in science subjects i.e. math, engineering and technology, was once very wide in the favor male students, and has now been narrowed. Despite of few studies that affirm girls' outstanding performance in STEM subject, they still fall behind boys in developed and developing countries (Asante, 2010). Literature about academic performance of boys and girls in science and math subjects exist with diverse views.

Theoretical Framework

This study is informed by social learning theories and feminist's approach to the understanding of gender and education. Social learning theory, basically derives from the work of Walter Mischel and Gabriel Tarde and later on developed by Julian Rotter and Albert Bandura. They assert that individual learns in social context through reward (reinforcing appropriate behavior) and punishment (extinguishing inappropriate behavior) (Bandura & Walters, 1977). They are simply anxious with the ways children model the behavior they see in others (Lindsey, 2015). Gender roles are learned directly through reprimands and rewards and indirectly through observation and imitation (Bandura &

Walters, 1997). It is pertinent to mention here that imitation and modeling appears to be spontaneous and not deliberately in children. Drawing on social learning theory allows us to use the concepts of reward and punishment, observation and imitation and sex-typed behavior as these were used by Bandura, Walters and Mischel. We also draw on Kate Millet's expression of the idea of omnipresent nature of patriarchy. In addition to these concepts, Simone de Beauvoir's concept of "other" has used to analyze gender and education.

Reward and punishment in this study is used as used by social learning theorists. They argued that reward and punishment are key elements of individual learning and shaping his or her role and behavior. Drawing on the work of key social learning theorists, Bandura, Walters and Mischel allows us to analyze how reward and punishment influence individual behavior and role in various spheres. This also enables us to analyze gendered academic performance. The concept of reward and punishment are also helpful in understanding that how girls performance is influenced through reward and punishment in society. Having said this, the study analyzes reward and punishment in the sense that how reward and punishment influence girls and boys academic performance. Drawing on the concept of punishment. We argue here that the underachieving and interest of girls in STEM education has highly influenced by parents and cultural perception. Social learning theorists argue that individual do not repeat the behavior and role when they do not get appreciation from society. Drawing on this, we argue that society and culture do not appreciate (punishment) girls to work and adopt careers in STEM fields which in turn discourage them to come in STEM education. Building on the concept of observation and imitation learning, we attempt to explain how role model influence girls and boys performance in education. Social learning theorists argued that individuals learn from role model around them through by observing and imitating them. Using observation and imitation in this sense, led us to argue that girls underperforming in science because they do not see female working as engineers and pilot. Thus, reward and punishment and observation and imitation as used by social learning theorists are key concepts in analyzing the data regarding boys and girls performance in education.

Research Methodology

It is notable to highlight that the article's aim is not only to examine girls' under-performance in science but also to explore deeper reasons of this gender reversal change in Khyber Pakhtunkhwa, educational system. Khyber Pakhtunkhwa covers an area of 74,521 sq. The study focuses urban district Peshawar of Khyber Pakhtunkhwa. According to census 2017, the total urban population of district Peshawar is 1970042, males are 1026145 female are 943676 and Transgender are 221 (Aslam, 2009).

As stated earlier the aim of this study is not merely to examine girls' poor performance in science but also to explore reasons of girls' under-performance in at

school and college levels. Therefore, our methodological approach in this paper is quantitative content analysis and interviews with school and college teachers. The aim of quantitative content analysis was to get clear picture of girls and boys performance in science subjects. The results books published between 2002 and 2017 of BISE, Peshawar, KP have been analyzed in line with quantitative content analysis technique. As a quantitative method, it is employed when the focus is on determining the percentage or frequency of an event. We employed quantitative content analysis to examine subject wise performance of girls and boys. The reason for doing content analysis of the results records was to know the current trends of girls and boys performance in science subjects.

After getting a clear picture of girls and boys performance, we conducted interviews with school and college teachers to give a diverse explanation and reasons of girls' underperformance in science subjects. The study was carried out in public schools and colleges of district Peshawar, Khyber Pakhtunkhwa. The district Peshawar was selected because gender reversal change has been observed in the urban centers of Khyber Pakhtunkhwa. In this study, we purposively interviewed 10 school teachers and 10 College lectures. In each school and college, 5 male teachers and 5 female teachers were interviewed. We interviewed both male and female teachers to get holistic picture of the trend, causes and factors of girls' outperformance. We designed interview guide with open ended questions to explore teachers' views on this issue. The duration of interview was 30 to 40 minutes.

Data were analyzed using thematic qualitative research technique. We followed all the procedures and phases of thematic analysis technique. The analysis has been carried out with the following procedures: a) We repeatedly read and transcribed the data to become familiar with all the aspects of data; b) after familiarizing with data and transcribing it, we coded data. The codes have been assigned broader category / themes. With a thorough review of the broader themes, we came up with more specific or narrow focused themes. Similarly, we defined and named each theme to know that what each theme is all about. The developing of themes has been underpinned both by the data and literature review. Each theme has been reflected by the relevant data from the field and discussed and debated with the help of theoretical and philosophical reviews skimmed for this study. The following key findings were derived from the teachers' interviews on girls' outperformance in education.

Findings

Quantitative data

The quantitative results reveal that girls unlike other subjects of general group and arts and humanities, are struggling in STEM education. It is pertinent to mention here that overall, girls' performance has been improved but boys are still ahead in STEM education. Table 1 gives a vivid picture of subject wise performance of girls and boys.

Table 1

Boy and Girls subject-wise performance in in the HSSC examinations between 2002 and 2017

Year	Category				Category				Category			
	Pre-Medical Group				Pre-Engineering Group				Humanities Group			
	1st	2nd	3rd	Overall Outperform	1nd	2rd	3rd	Overall Outperform	1st	2nd	3rd	Overall Outperform
2002	Girl	Boy	Girl	Girl	Girl	Girls	Boys	Girls	Girl	Girl	Girl	Girl
2003	Boy	Girl	Girl	Boy	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2004	Girl	Boy	Girl	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2005	Girl	Girl	Boy	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2006	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2007	Girl	Girl	Girl	Girl	Boy	Girl	Boy	Boy	Girl	Girl	Girl	Girl
2008	Boy	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Boy	Girl	Girl	Girl
2009	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Boy	Girl	Girl	Girl
2010	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2011	Girl	Girl	Boy	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2012	Girl	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2013	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Boy	Girl
2014	Girl	Girl	Boy	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2015	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
2016	Girl	Girl	Girl	Girl	Boy	Boy	Boy	Boy	Girl	Girl	Girl	Girl
Out Performed: Girls=84.4%, Boys=15.6%					Out Performed: Girls=8.9%, Boys=91.1%				Out Performed: Girls=93.3%, Boys=6.7 %			

(Results Records of BISE Peshawar, 2002-2016)

Table 1 represents the subject-wise performance of boys and girls in HSSC examination from 2002-2016. In the examination held in the year 2002, girls and boys have shown different performance in the subjects of pre-medical, pre-engineering and humanities group. Girls have outperformed boys in the group of pre-medical and humanities but they underperformed in the group of pre-engineering. Similarly, the mentioned table shows that girls are significantly outperforming boys in terms securing positions in pre-medical and humanities. The results records show huge gap in the overall positions in the group of pre-medical where the percentage of girls in the first three positions are :(Girls=84.4%, Boys=15.6%) from 2002-2016. Similarly, in the group of humanities, girls are outstripping boys in terms of positions in the examinations (2002-2016). Girls have clenched 42 out of 45 position and boys have secured only 3 positions. The overall percentage of girls' positions in the humanities is 93.3% whereas the percentage of boys' positions is 6.7. This means that girls have dominated boys with huge margin in the subjects which are traditionally considered as feminine subjects. However, the point to be noted here is that despite of this tremendous performance of girls, they are underperforming in the category of pre-engineering.

The data in the table show that there are total 45 positions i.e. 1st, 2nd and 3rd in the category of pre-engineering from 2002-2016. Boys have whitewashed girls in terms of achieving positions. The data illustrate that 41 out of 45 positions belong to boys while only 4 positions are secured by girls. The overall percentage of boys' top three positions is 91.1 and girls' percentage of the top positions is only 8.9. The findings, thus confirms girls' outstanding performance in the HSSC examinations and they have dominated boys with the exception of science related subjects. The findings are in line with the empirical studies conducted in early 2000s. For example, Goldin, Katz and Kuziemko (2006) argued that girls are outshining boys in humanities with huge margin but their performance is weak in science. Our assertion to be noted here is that girls despite of good performance in education, are not catching up boys in science subjects.

Findings and Discussion

Qualitative data

Drawing on the quantitative findings, we argue that in the context of Pakistani society, girls are underperforming in science. It is pertinent to mention here that comprehensive studies on the reasons of girls' poor performance in science are lacking. Keeping this in view, the forthcoming section of the article provides substantial information on the diverse reasons of girls' underperformance in science.

Cultural Marginalization of Girls

The culture and social context of any society affect the performance and interest of boys and girls in education differently. For instance, as highlighted by (Chiu & Chow, 2010) that in societies having male dominancy girls and boys have different interest and choices. They asserted that in such societies' girls have lower ambitions for STEM education and jobs. The study findings also reveal that culture discourages girls' student to come in the field of STEM subjects. It was unearthed that hard science/pure science are considered inappropriate for girls. The following example taken from the interview session is indicative of the statement.

> I firmly believe, that girls can also do well in science subjects if they are given favorable environment like boys. Unlike, boys, culture discourages girls to join coaching classes for science subjects. Our culture deems these subjects inappropriate for girls' student.

A similar point of view was held by a senior science school teacher (male). He argued in the following way:

> Our culture and traditions are responsible for gendered performance in education. For example, girls are considered suitable for teaching, doctor and nursing profession in our society. On the other hand, boys are encouraged to be engineer, pilot and a variety of other jobs in the public domain.

The above quotes indicates that gender disparity in educational attainment in STEM subject stems from cultural pressure and socialization process. This is also highlighted in the studies of stereotypes and identity threat (Aronson & McGlone, 2009).The central argument of these studies are that STEM interest and performance is highly influenced by cultural pressure and beliefs.

A female teacher asserted that "a girl who is teacher or doctor is preferred for marriage. People do not marry a girl who is associated with a profession that needs involved dealing and interaction". This means that culture does not encourage a girl study hard sciences which may enable them to seek job in other fields. Thus, they lag behind in science subjects in terms of performance. This shows that our culture supports and favors boys when it comes to the matter of outstanding performance of boys and girls in such subjects. Another respondent said that" our culture are responsible for the underachievement of girls in science subjects because the jobs associated with these subjects are not liked and accepted in our culture" reinforcing the aforementioned argument, another respondent expressed that" that our culture has idealized teaching and doctor profession for girls".

A male College lecturer argued:

> Our culture is responsible for the gendered performance in science subjects. From the very outset female child is given doll and male child is given vehicle. Boys are playing with machine and girls with accessories and dolls home. This inspires boys and girls in different educational directions.

It can be argued that the gendered experiences in early childhood (pre-school time) may be a reason for girls' lack of interest and poor performance in science subjects. The similar finding has given by (Thomson et al., 2012). They assert that girls should be given equal space in culture to experience the ‘scientific activities’ that will boost their societal orientation towards science. This embodies what Brownwyn Davies (P.N) called 'gender duality' which pushes boys and girls into different sets of behaviors. It is being asserted here that the consequences of this gender duality is reflected in the later stages.

One of the respondent argued "science subjects especially math, chemistry and physics need coaching classes. Our culture does not allow girls for coaching classes".

The above responses allow me to engage Nancy Cott. Nancy Cott, who asserts in her famous work ‘difference’ and ‘sameness’ debates in feminism that women have the same intellectual qualities like men but due to cultural constrains and patriarchal structure, women do not get equal access to public spheres of life. Similarly, Kate Millett, in *Sexual Politics*, argues that the omnipresent nature of patriarchy and the ways it drew attention to the pervasiveness of patriarchy and to the ways in which it is supported

through family and culture are the roots causes of gender inequality in education. The point to be noted here is that the poor performance of girls in STEM and underperformance of boys in Arts and humanities do not arise from the innate differences in abilities but are the outcome of gendered family and omnipresent nature of patriarchy which pushes girls to indoor activities.

Family Influences

This study found family (parents) lack of interest in STEM subjects for their daughters. The study findings revealed that majority of the respondents believed that parents do not allow their daughters to study science. Parents do not want their daughters to be pilots and engineers. One of the respondents argued." In our society, female consider themselves unfit for science subjects. They face problems and restriction from their parents. My own daughter want to do Chartered Accountant (CA) but my husband does not allow her to do CA with the reason that she will work with male after completing CA".

Another respondent argued that "parents push their daughters to become teachers and they never allow them to join a job that needs public contact".

The above responses reveals that parents are not in the favor of their female child to come into Science Technology Engineering and Math subjects. The similar findings has given by (Smith, 2011) in his study on "Women into science and engineering? Gendered participation in higher education STEM subjects" The referred study reveals that parents do not allow their daughter to graduate in science subjects. (Council, 1983) found that parents discourage female students from studying science subjects which they stereotype as masculine. They encourage them to study humanities and soft science.

The above responses, has close link with social learning and cultural theories. Girls whenever want to study and opt science subjects, they are strictly discourage which in turn influence their interest in STEM subjects from very outset. Boys are rewarding in our society in STEM subjects and this motivate them and performing well in science subjects. In family, girls don’t have role model in shape of engineer, math or physics teachers which is very much important in motivating and encouraging someone.

Poor Quality of Teaching in Girls' School and Colleges

Poor quality of teaching for science subject in girls' school was reported as one of the key reasons of girls' underperformance in STEM. Poor quality science teaching at school level does not enable girls to enter higher education with strong science background. Many of the study respondents revealed that poor teaching especially at school level affect the performance of girls' student in STEM subjects. Senior lecturer argued:

> Unfortunately, we do not have good and well qualified female teachers for science subjects especially at primary and middle level. Thus, female students enter into secondary and higher secondary level with a very week base which later on result in their underachievement in STEM subjects.

A senior school teacher highlighted that" there is worse quality of teaching in girls' schools which stops girls from doing well in science". A third respondent said: "Girls fall behind in engineering subjects as they do not get subject specialist at school level". An almost similar response was given by another respondent that "girls do not have good teacher for math and science in school which badly affect their performance in science subjects". Another respondent argued that" girls are week in science subjects because female teachers do not have the required skills to teach physics, math and chemistry. Another respondent opined that" female teachers cannot teach science subject which result in the underperformance of girls in science subjects".

It is important to note that schooling has important role in the academic journey of any students (Burridge, Whalan & Vaughan, 2012). Boys in our society are sent to private schools staffed with skillful and qualified teachers. They get a very strong base which later on boost their performance in STEM subjects. The study findings reveal that school has undeniable role in the outstanding performance of boys in science subjects. To strengthen the argument one of the respondents argued that" boys complete their initial schooling in private schools where they get good teachers of STEM subjects".

Another respondent said that" boys are doing well in STEM subjects because they get qualified teachers at school levels". One of the teacher linked boys' underperformance in arts and humanities in the way that "boys see their role model in school in shape of science teachers which in turn, motivate them to study science subjects. This response led me to engage social learning theory which state that role model has significant role in the construction of one's behavior. Boys have more role model in school than girls which reinforce their performance in science and arts subjects. Thus, it is asserted that poor teaching at school level is one of the core reasons that affect girls' performance in Science, technology, engineering and math subject.

Nature of Jobs Associated with STEM Subjects

Jobs associated with STEM subjects are not considered appropriate for girls in our society. The respondents asserted that girls do not come into such subjects because they think that the jobs that they will get after the award of STEM subject is not accepted in our society for girls. One of the science lecturers argued:

> Girls are behind than boys in science, technology, engineering and math subjects. The reason is very clear jobs associated with STEM subjects are not considered appropriate for girls. This discourages and prevents girls to study subjects that fall in the domain of science.

An almost similar response was given by another respondent who argued that "the job market of STEM subjects compel girls to avoid these subject".

Study findings spot culture in the favor of girls to do well in Arts and Humanities. One of the respondents told that "Our culture plays significant role in the outperformance of girls in arts and humanities subjects. Girls feel safe in the jobs associated with these subjects" strengthen the aforementioned argument. This means that our culture do not allow girl to get job that needs exposure. Another respondent believed that" girls are outstripping in arts and humanities subjects because the culture has idealized these subjects for them". These responses point out culture as the key contributing factor in girls' outperformance. This means that job prospect is the motivating factor for students to perform well in education. In our society, jobs which comes after fulfilling degrees in STEM subjects, are disliked for girls.

This job is motivating factor for boys to perform well in STEM subjects. One of the several excerpts is mentioned here to substantiate the argument "Boys are doing well in STEM subjects while underperforming in arts and humanities. The jobs which is associated with STEM subject are considered masculine and respectable jobs while jobs that are associated with arts and humanities are not deemed important in our culture that motivates boys to study these subjects. Therefore, they are taking interest in the STEM subjects.

Feminization of Teaching Profession

School teaching is one of the preferred professions for female (Durrani & Dunne, 2010) . The preference for school teaching for female is not limited to Pakistan but also found in other societies. This glorification and approval of school teaching as the best profession for female discourage young girls study STEM and aspire for career in the field of science and technology. The findings of this research substantiate the above argument. One of the study respondents argued that" this perception of teachers greatly affect the performance of girls in STEM subjects. Another respondent argued that "In our culture, people prefer teaching profession for girls. This attitude influences boys and girls performance in education accordingly".

It is asserted here that girls if allowed by their parents may perform well in historically male dominated subjects. Nevertheless, they are not provided equal opportunities not only at family level but also at school level which greatly affect their performance in science subjects. Parents stereotype these subjects as masculine which discourage girls to take these subjects at school and college level. This led us to engage social learning theory which dominantly argue that reward and punishment reinforce once behavior. Connecting it with education, it is argued here that in our society girls' education is appreciated and therefore we see, they are outperforming boys in education.

Here, the main problem which discourage girls to study STEM subjects is that they are not getting appreciation from their parents' side which in turn discourage them.

Cramming Style of Learning

The study findings point cramming as one of the key factors of girls' underperformance in STEM. Girls are good Crammers and cramming does not work in science and conceptual subjects. One of the respondents argued that "girls are learning lessons by heart which is not possible in STEM subjects and therefore they are not doing well in these subjects". Another respondents told that "girls are crammers and undoubtedly this fails in science subjects." Reinforcing the aforementioned arguments. Another senior teachers told that" girls like to learn things and this science subjects have numerical reasoning which is difficult to cram.

Some of the respondents linked the outstanding performance of girls in Arts and Humanities due to their habit of framing. One of the respondent argued that" girls are crammers. Math and physics have numerical reasoning which cannot be learnt through cramming". Another respondent told: "girls like theory instead of numerical problems and conceptual readings.

The responses attribute girls outperformance to their habit of cramming which justifies girls underperformance in STEM subjects with the argument that cramming does not work in STEM.

Conclusion and Discussion

The paper has discussed the underperformance at school and college level in Peshawar, Khyber Pakhtunkhwa. The study findings unearthed various underlying reasons of girls' under-performance at school and college level. It is pertinent to mention here that the study findings confirm the views of feminists scholars especially of Nancy Cott who stated that women have the same intellectual qualities like men but due to cultural constrains women do not get equal access to public spheres of life. Similarly, Simone de Beauvoir asserts that one is not born but becomes genius. In addition, this review also questions the biased and controversial theories of biological endeavor. To sum up, it can be argued that girls underachieving in science related subjects are the direct response of factors embedded in society.

Recommendations

On the basis of the study findings and conclusion, this article recommends that girls can do well in science subjects if they are given favorable and conducive environment. Teaching quality in female schools need to be improved. Moreover, society and people should encourage girls in science subjects. In short, to address this issue, the following measures need to be taken.

1. There should be conducive and favorable environment for girls like boys at school and college levels.
2. Teaching quality in female schools needs to be improved.
3. Parents should encourage girls when they express interest in science education.
4. This issue needs to be addressed from the viewpoints of parents and students.

References

Alexander, R. (2016, June). What's the point? Select Committee Ponders the Meaning of Education. In *FORUM: for promoting 3-19 comprehensive education* (Vol. 58, No. 2, pp. 155-166). Symposium Books. PO Box 204, Didcot, Oxford, OX11 9ZQ, UK.

Aronson, J., & McGlone, M. S. (2009). Stereotype and social identity threat. *Handbook of Prejudice, Stereotyping, and Discrimination*, 153–178.

Aslam, M. (2009). Education gender gaps in Pakistan: Is the labor market to blame? *Economic Development and Cultural Change*, *57*(4), 747–784.

Baker, D. P., & Jones, D. P. (1993). Creating gender equality: Cross-national gender stratification and mathematical performance. *Sociology of Education*, 91–103.

Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1). Prentice- hall Englewood Cliffs, NJ.

Burke, R. J., & Mattis, M. C. (2007). *Women and minorities in science, technology, engineering, and mathematics: Upping the numbers*. Edward Elgar Publishing.

Burridge, N., Whalan, F., & Vaughan, K. (2012). *Indigenous education: A learning journey for teachers, schools and communities* (Vol. 86). Springer Science & Business Media.

Ceci, S. J., & Williams, W. M. (2011). Understanding current causes of women's underrepresentation in science. *Proceedings of the National Academy of Sciences*, *108*(8), 3157–3162.

Cheryan, S., Ziegler, S. A., Montoya, A. K., & Jiang, L. (2017). Why are some STEM fields more gender balanced than others? *Psychological Bulletin*, *143*(1), 1.

Chiu, M. M., & Chow, B. W. Y. (2010). Culture, motivation, and reading achievement: High school students in 41 countries. *Learning and Individual Differences*, *20*(6), 579–592.

Council, B. (1983). *Media in education and development: A journal of the British Council*. published for the council by P. Pregrinus Ltd.

Durrani, N., & Dunne, M. (2010). Curriculum and national identity: Exploring the links between religion and nation in Pakistan. *Journal of Curriculum Studies, 42*(2), 215–240.

Goldin, C., Katz, L. F., & Kuziemko, I. (2006). The homecoming of American college women: The reversal of the college gender gap. *Journal of Economic Perspectives, 20*(4), 133–156.

Hedges, L. V., & Nowell, A. (1995). Sex differences in mental test scores, variability, and numbers of high-scoring individuals. *Science, 269*(5220), 41–45.

Lindsey, L. L. (2015). *Gender roles: A sociological perspective*. Routledge.

Machin, S., & Pekkarinen, T. (2008). Global sex differences in test score variability. *Science, 322*(5906), 1331–1332.

Perez-Felkner, L., Nix, S., & Thomas, K. (2017). Gendered pathways: How mathematics ability beliefs shape secondary and postsecondary course and degree field choices. *Frontiers in Psychology, 8,* 386.10.3389/fpsyg.2017.00386

Shams, F. (2017). *Aid Effectiveness in Education: A Case Study of Pakistan From 2005-2015* (Doctoral dissertation, UCL (University College London)).

Smith, E. (2011). Women into science and engineering? Gendered participation in higher education STEM subjects. *British Educational Research Journal, 37*(6), 993–1014.

Thomson, S., Hillman, K., Wernert, N., Schmid, M., Buckley, S., & Munene, A. (2012). *Monitoring Australian year 4 student achievement internationally: TIMSS and PIRLS 2011*.

Ullah, R., & Ullah, H. (2019). Boys versus Girls' Educational Performance: Empirical Evidences from Global North and Global South. *African Educational Research Journal, 7*(4), 163-167.