Proceedings of the 2nd International Conference on Interdisciplinary Humanities and Communication Studies
DOI: 10.54254/2753-7048/29/20231462

The Discouragement of Chinese Girls in STEM Careers

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Abstract: Gender equality has become a global priority in Science, Technology, Engineering, and Mathematics (STEM). Despite advances in STEM education, a puzzle persists among Chinese girls despite advancements. It aims to examine why Chinese girls continue to hesitate to pursue STEM careers. This paper aims to examine the multifaceted factors influencing Chinese girls' reluctance to attend STEM institutions. These influences include cultural, social, educational, and familial influences. This study finds that persisting challenges persist in STEM education despite considerable government efforts to promote gender equality. As Chinese girls continue to be disadvantaged by cultural norms, societal expectations, educational systems, and family dynamics, they continue to face barriers to STEM involvement. In addition to achieving gender equality, these barriers must be addressed to enrich the nation as a whole. In order to improve socioeconomic development and innovation in China, Chinese girls must be empowered in STEM. Ultimately, it will make China more inclusive, equitable, and prosperous by harnessing the untapped potential of half the population.

Keywords: gender equality, STEM education, Chinese girls, cultural influences, societal expectations

1. Introduction

As countries strive to ensure a balanced representation of women and men in Science, Technology, Engineering, and Mathematics (STEM) fields, gender equality has become a global objective. The United Nations Educational, Scientific and Cultural Organization (UNESCO) report found that 30 percent of female students in higher education chose STEM-related fields, and 28% of female researchers worked in similar fields [1]. In recent years, China has made strides in this direction, promoting gender equality in STEM education in its technological and scientific arenas. Nevertheless, a perplexing contradiction arises. In this paper, the author argues that Chinese girls are still discouraged from choosing STEM careers despite ongoing attempts in order to achieve gender equity in STEM education. As part of this paper, the author will explore the cultural, educational, and societal factors contributing to the continued discouragement of Chinese girls in STEM fields.

2. Societal Factors

Parents' expectations play a significant role in shaping the educational and career choices of their children, particularly for girls. For centuries, Chinese society has been deeply rooted in traditional gender norms and expectations. A significant number of parents still adhere to these norms and

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expectations. Girls and boys are often assigned different roles and career paths according to these norms. The expectation is normally that sons will pursue careers that are considered prestige, financially stable, and aligned with STEM fields, such as engineering or technology, so that their fathers can be proud of them. As opposed to that, daughters are encouraged to pursue careers that are perceived as nurturing, and supportive, or that are culturally deemed to be more fitting for women, such as teaching or healthcare. It is important to note that these expectations stem from centuries-old beliefs about gender roles, marriage, and domestic responsibilities. The majority of parents tend to hold stereotypical views about appropriate career paths for their children based on the gender of the child. When parents don't actively support and encourage their daughters' curiosity or interest in STEM topics, they may unwittingly reinforce gender stereotypes based on their own expectations.

As it relates to education and career choices, parental expectations can have a significant impact on more than just immediate decisions. Discouragement from parents may cause girls to lose confidence in their abilities, negatively affecting their academic performance and future prospects. Female STEM major students in China scored significantly higher on academic tests than their male counterparts. According to these studies, results that appear contradictory are due to the concept of success fear [2]. As a result of the influence their families have on them from an early age, girls have lower career ambitions and exhibit more negative emotions than boys.

Aside from that, media and cultural portrayals play an important role in shaping societal perceptions of STEM careers among Chinese girls. Various media, including television, cinema, advertising, and popular culture, can reinforce gender stereotypes by depicting STEM environments dominated by men and reinforcing traditional gender roles. This type of portrayal may lead girls to believe that STEM is not the field for them or that it is not a suitable one.

Women are underrepresented in STEM-related media and cultural narratives, which can be discouraging to girls as well. There is a substantial gap between female Science and Technology workers and their male counterparts, and more effort needs to be made to develop human capital. There is a relatively low proportion of female top-rated scientists and engineers, especially in the sciences [3]. Girls who don't see female scientists, engineers, or technologists celebrated or represented in a positive light in the media can lose their belief in their own potential in STEM fields when they do not see their own heroes being celebrated. A shortage of diverse role models in STEM is often manifested in media and cultural representations. Girls may have difficulty identifying with STEM professionals who reflect their own backgrounds, experiences, and aspirations because of this lack of diversity.

3. Cultural Factors

Chinese culture has been profoundly influenced for centuries by Confucianism, a philosophical and ethical system that emphasizes hierarchy, family relationships, and moral conduct [4]. The Confucian tradition emphasizes the importance of maintaining harmony and stability in society through clearly defined roles and relationships. The male gender has traditionally occupied positions of authority and responsibility, while the female gender is expected to perform her assigned roles within the family.

According to Confucian values, filial piety is particularly important among children toward their parents. Historically, sons have been expected to provide primary care to their aging parents. In order to fulfill this responsibility, sons were expected to pursue stable and prestigious careers. The Confucian philosophy also reinforces the dominance of men both within the family and in society as a whole. In the past, men dominated the workforce, occupying leadership and authority roles. Contrary to this, women were expected to fulfill domestic roles such as those of wives, mothers, and caregivers. Managing the household and raising children were their primary responsibilities. Women are expected to spend more time with their families rather than working outside the home as part of the traditional division of labor [5]. In this regard, the strong social responsibility of being the primary

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caregiver of the family may discourage women from participating in competitive and intensive careers, such as those in STEM.

In STEM fields, Confucian values have perpetuated gender disparities through a historical legacy. Due to a history of preferring sons and relegating women to domestic roles, women are underrepresented in STEM fields. Furthermore, Confucianism's emphasis on family harmony and social harmony may lead to girls feeling under pressure to conform to traditional gender roles. A pursuit of STEM careers may be interpreted as a departure from these roles and as potentially disrupting the harmony between them. It should also be noted that Confucian values can reinforce conservative attitudes, with some viewing the pursuit of STEM careers by girls as a challenge to established gender norms. Girls who express an interest in STEM may encounter skepticism and resistance as a result of this conservatism.

4. Educational Factors

The Chinese government has implemented several policies aimed at promoting gender equality in education in recent decades, in recognition of the importance of equal opportunity in education. In spite of the fact that these policies represent commendable efforts to promote gender equality in education, their effectiveness in practice faces several challenges and limitations as well. It is often the case that there is a difference between the formulation of policy and its implementation at the local level. A lack of sufficient resources and a lack of prioritization of gender equality initiatives by local authorities can result in uneven implementation across regions.

Educators, parents, and students continue to be influenced by deep-rooted cultural norms and stereotypes. It is possible for some educators to continue to hold traditional views about gender roles, which can impede the effectiveness of policy initiatives. The findings of three Australian studies suggest that early childhood educators tend to prioritize building boys' skills in traditionally "masculine" activities such as architecture and engineering [6,7]. In the study, the researchers found that ECEs employ gender-specific terminology, such as referring to children as engineers or female engineers, and engage boys in more open-ended questions [6,7]. These activities inadvertently communicate to female individuals that the field of STEM is predominantly male-dominated, resulting in unwarranted adverse effects on their future involvement and progress in STEM disciplines [8].

Researchers have demonstrated that educators are susceptible to gender biases, and female students may also improve their academic performance and interest by interacting frequently with teachers, especially during class time [4]. Nevertheless, in STEM classrooms, teachers may unconsciously give girls less attention and encouragement than they do to their male counterparts. It is possible that they hold stereotypes about the abilities of girls in mathematics and science. In STEM test performance, there is a gender disparity due to mathematics anxiety, which negatively impacts test performance and math performance in general, and it inhibits the performance of female students disproportionally [9]. Textbooks, curriculum materials, and classroom activities may contain gender biases. There is a possibility that these materials may portray stereotypical images of gender roles or provide examples that may reinforce gender biases in STEM fields in an unintentional manner. In addition, there is evidence that the classroom environment itself can contribute to gender bias. Having a low representation of female STEM teachers and role models may perpetuate the notion that STEM is a field dominated by men. Girls may not be motivated to pursue STEM subjects as a result of this.

Girls may experience reduced academic performance when they encounter gender bias in STEM classrooms. They may be hindered from excelling in STEM subjects because of a lack of encouragement, unequal opportunities, or an overall sense of undervaluation. In the long run, girls who are subjected to gender bias may lose interest in STEM subjects. In these fields, gender

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imbalances may be further perpetuated when women choose non-STEM career paths that seem more welcoming and supportive to them.

5. Implications

It is crucial to note that the discouragement of Chinese girls from pursuing STEM careers carries significant repercussions for both gender equality in STEM and the socio-economic development of China. The number of college graduates in China in 2015 was 3,585,940. A total of 52.4% of them were female [10]. On the other hand, it was estimated that 5,482,528 research and development personnel worked in the field in 2015. There were fewer women than men among them, accounting for only 26.56% [11]. Gender bias in STEM fields persists, as do discouragements for girls to pursue this field. Consequently, China is less likely to be able to harness the full potential of its talent pool to drive innovation and technological advancements. In order for China to remain competitive in the global economy, gender equality in STEM is essential. Increasing girls' interest in STEM careers can strengthen the nation's innovation capabilities and contribute to technological advancements.

Diversity in the STEM workforce contributes to a richer pool of perspectives, ideas, and solutions. Girls' participation in STEM fields can enhance innovation and problem-solving. Equal opportunity for women and men in STEM fields is not only a matter of economic necessity but also of social justice. To ensure that girls can benefit from modern society's advancements and contribute to them, it is important to encourage them to pursue STEM careers. As the world becomes increasingly interconnected, China's efforts to promote gender equality in STEM can facilitate collaboration with other nations committed to fostering diversity and inclusion.

6. Recommendations

It is critical that a comprehensive and multifaceted approach be adopted in order to address the discouragement of Chinese girls from pursuing STEM careers. In the first place, mandatory teacher training programs should be implemented to address gender bias in the classroom. It is important to promote inclusive teaching practices that actively engage all students, regardless of their gender. Additionally, educational materials and textbooks should be updated to present examples and narratives of diversity and inclusion. Throughout history, women have made significant contributions to STEM fields.

Education reforms are essential to ensuring that girls are provided with a supportive environment in the STEM fields. There is a need to encourage the exploration of STEM fields through inclusive STEM programs and extracurricular activities. It may be helpful for girls to be matched with female STEM professionals through mentoring programs that will provide guidance and support.

Initiatives aimed at raising social awareness are crucial. The media, advertising, and popular culture should launch national campaigns that challenge gender stereotypes and biases. Parents should attend workshops and seminars to learn how to support their daughters' interests in science, technology, engineering, and mathematics.

As a final point, corporate and industry engagement can provide valuable support. For girls interested in STEM, collaboration with private sector companies and industries can provide internships, scholarships, and encouragement. There is a need for government commitment at all levels. Through dedicated funding, programs, and initiatives, agencies should demonstrate their commitment to achieving gender equality in STEM.

7. Conclusion

In conclusion, Chinese girls continue to be discouraged from pursuing STEM careers, despite ongoing efforts to promote gender equality in education. Cultural, societal, educational, and familial factors

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have been investigated to reveal the intricate web of challenges these girls face, including deep-rooted cultural norms and gender bias within STEM classrooms. A number of factors are at play in shaping gender disparities in STEM, and these forces must be acknowledged and addressed if gender disparities are to be addressed effectively.

In order to resolve these issues, it is imperative that they are addressed. Providing equal opportunities to Chinese girls is not only a matter of ensuring their equality, but also a vital step towards enriching the country as a whole. It is crucial for innovation, progress, and socioeconomic development for girls to become involved in science, technology, engineering, and mathematics fields. In other words, it represents a commitment to uncovering the untapped potential of half the population, unleashing their creativity, and enabling them to contribute to the technological advances that will shape the world in the decades to come. Women's equality in STEM is not just a desire to achieve equality for its own sake; it is a strategic imperative, a moral imperative, and a visionary aspiration that will ultimately make China more inclusive, equitable, and prosperous in the future.

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