

Are Men from Mars and Women from Venus? Bridging the gender learning gap in medical education

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هل الرجال من المريخ والنساء من الزهرة؟
سد الفجوة التعليمية بين الجنسين في التعليم الطبي

جمانة صالح

THERE HAVE BEEN TREMENDOUS DEVELOPMENTS in the area of medical education of late, including the introduction of problem-based learning (PBL) and team-based learning (TBL). Undoubtedly, these new methods of teaching have significant benefits in enhancing learning skills and medical learning outcomes. However, it is still too early to conclude that these relatively recent techniques can solve problems that have persisted from following structured curricula in the past. One issue worth highlighting is the gender learning gap. For years, female students have repeatedly shown superior academic results in comparison to their male counterparts.^{1–3} A greater number of women gain admission into medical schools, where they outperform their male colleagues academically; they also go on to earn more graduate degrees.^{4,5} The widening of this gender learning gap—particularly in the medical and healthcare fields—is of growing concern. Reasons for this phenomenon may include social, cultural, psychological and emotional components.⁴

Since the 1960s, various women's equality movements have encouraged the development of environments which support education and career advancements for women. Some researchers claim that the superior academic performance demonstrated by women in medical careers is due to their instinctive desire to help humankind.^{4,6} Women have also been described as being more perceptive to emotions, enabling them to be more caring and empathetic.⁶ Their enhanced academic performance may also be due to goal setting, commitment and discipline in following a structured curriculum, spending more time studying and developing stronger social networks; these attributes may develop as a result of social and cultural customs that encourage women to perform well academically.⁷ One theoretical explanation proposed by Raymond *et al.* is the influence of family

practices, such as parents encouraging gender-specific roles among their children; for example, girls are usually expected to be well-mannered, compliant and accept rules.⁸ These behaviours evidently promote academic achievement in traditional academic settings.^{9,10}

Conversely, male students favour less constrained learning environments and focus on achieving high grades in their final tests, developing learning skills to meet this purpose.^{11–15} Nevertheless, researchers have expressed concern that the perceived idea of female students as “highly motivated” may encourage teachers to give them more attention and overlook equally motivated male students, further enhancing the gender learning gap.⁹ Another theory is that increasing numbers of independent, educated and employed mothers are acting as role models for their daughters.⁹ Furthermore, it may be that although women sense their lower status in society compared to men, they anticipate that implementing greater efforts in their education may justly reward them with a more equitable future. In 1989, Mickelson proposed the ‘Pollyanna principle’ to explain the tendency for individuals to remember agreeable occurrences over unpleasant ones.¹⁶ In light of this theory, many young women may remain optimistic about their future as, in their view, gender discrimination in the workplace is a problem of the past and society is moving towards gender equity. This may explain the higher academic achievements of young women who have not yet suffered occasions of gender inequality.

Stereotyping in medical education is a significant factor that influences women's academic aspirations by discouraging interest in occupations usually dominated by males, such as engineering and mathematics.^{17,18} The authors of some studies have argued that the gender gap in medical specialties may be due to reinforcement of the idea that genetic

factors render males more capable of performing in fields related to mathematics and physics.^{19–21} Unfortunately, stereotyping is still apparent in certain medical specialties; in general, more women practice in so-called “feminine” specialisations, such as paediatrics and gynaecology, while more men specialise in “masculine” areas, such as orthopaedic surgery. Moreover, male healthcare practitioners tend to hold positions with higher status and better pay in comparison to their equally qualified female colleagues.^{22,23}

The differences in academic performance attributed to effort and engagement, as a result of social and cultural aspects, have been studied extensively. However, there is mounting evidence which indicates that gender disparity in academic performance is inherently associated with biological differences that influence learning behaviours in males and females. The author of *The Female Brain* highlights that males and females have brains that are biochemically and neurologically programmed to perform different tasks from an early age.¹⁵ Other researchers have commented that young boys occupy more space when learning, due to their continuous movements, compared to girls.^{1,15} In addition, boys seem to prefer engaging and interacting in rough play, sports and building activities as well as reading action books.¹ Interestingly, a recent comprehensive study also showed that the neural connections in male and female brains are different; female brains were found to have more connections between the two hemispheres of the brain while males had more connections within each hemisphere.²⁴ These findings agree with those of Clements *et al.*, who observed that males prefer to execute individual tasks and are better at performing motor activities than women.²⁵

Testosterone, the male hormone, enhances the spatial and visual acuity of the sense organs, affecting activities that require spatial skills such as geometry, physics, engineering and navigation.^{26–28} This may explain why more men become pilots and architects. Specific areas of the male brain mature earlier than females and males have more grey matter related to intelligence, including tasks involving mathematics and problem-solving.^{29,30} On the other hand, increased interhemispheric neural connectivity and the largely increased white matter related to intelligence in female brains renders women more capable of coordinating analytical reasoning and intuition.²⁴ As such, women tend to excel in multitasking which requires the use of both hemispheres; this might explain why women are traditionally tasked with handling various household activities and responding to family needs simultaneously. Also, the cerebral cortex in women is

highly organised in a pattern which has been linked to increased empathy and creative expression.^{31,32} Nevertheless, it is important to keep in mind that there are more similarities than differences between male and female brains.²⁴

In collaboration with other scientists, Dr. Denckla from the Kennedy Krieger Institute found that anatomical differences in the brain—specifically, the language functioning areas of the brain—occur from an early age.³³ Female fetuses at 26 gestational weeks had a thicker *corpus callosum*, the nerve tissue connecting the right and left hemispheres of the brain, compared to males; upon listening to certain triggers, the brains of the female fetuses showed activity in both the left and right hemispheres, whereas only the left hemisphere was activated in males.³³ Dr. Denckla also revealed that the areas of the female brain linked to language skills mature approximately six years earlier than for males, which may result in stronger language and communication skills among women.^{29,33} Clements *et al.* also provided clear evidence of lateral differences between females and males when processing language versus visuospatial information.²⁵ Differences in brain function may also be explained from the perspective of human development. In a hunter-gatherer society, male hunters had to exhibit intense sensory reflexes to be able to detect their prey and kill it without feeling sympathetic.³⁴ Strong motor function skills would also have helped men to design hunting tools and weapons. Conversely, greater emotional intelligence may have been a factor that drove women to respond intuitively to the needs of a crying baby without requiring verbal expression.³⁴

The adoption of PBL and TBL techniques in medical education, while still advantageous for female students with their proficient communication skills, could be a major shift for male students who can now display their problem-solving skills in suitable academic settings that encourage and nurture their abilities and remove gender-based stereotypes. Gradually, PBL and TBL may remove the academic bias in favour of females, or males in certain specialties, as a result of social, cultural, behavioural and biological factors. Consequently, curricular changes towards PBL and/or TBL approaches may help bridge the gender learning gap in medicine.

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