

Discussion Guide – Gender Diversity in Teaching

Recognizing and teaching to differences in learning

Are there differences in learning between males and females?

- i) “Are you certain” Activity
- ii) Discussion points:

Neurological differences:

- There are 4 key areas of difference in the brain: processing, chemistry, structural, brain flow and activity
- Processing: The gray-white matter difference explains why in adulthood, females are great multi-taskers, while men excel in highly task-focused projects
- Chemistry: males on average tend to be less inclined to sit still for as long as females and tend to be more physically impulsive and aggressive
- Structural: Females also often have a higher density of neural connections into the hippocampus. As a result, girls and women tend to input or absorb more sensorial and emotive information than males do. Girls tend to use more words when discussing or describing incidence, story, person, object, feeling, or place. Males not only have fewer verbal centers in general but also have less connectivity between their word centers and their memories or feelings
- Brain Flow and Activity: Females will often ruminate on and revisit emotional memories more than the male brain. Males tend, after reflecting more briefly on an emotive memory, to analyze it somewhat, then move onto the next task.

Environmental Differences:

- Researchers in multiple studies have revealed that ethnic identity and gender stereotypes affect college students’ academic performance; most notably in STEM
- Gendered socialization: gender is a social construct that dictates behaviour, attitudes, perceived ability that are expected and encouraged based on a person’s sex. Gender socialization is the process through which people are expected to and encouraged to conform to these constructs and it happens in all spheres: family, school, social, etc.
- Researchers are not sure if gender socialization is rooted in genetic differences. We do know that gender socialization happens starting at an early age, and has a substantial effect on STEM participation by women
- Gender roles and socialization relate directly to the concept of the STEM field gender gap because researchers have continually found evidence of gender stereotypes related to STEM professions

- Women are leaving the STEM pipeline before entering the official STEM profession. This STEM pipeline phenomenon loses women who could become the next generation of scientists, engineers, and creators of technology.
- Researchers have found that one of the reasons women are leaving the STEM pipeline and professional field is because women are bombarded with socialized ideas and negative stereotypes, specifically about women's subpar math abilities).
- These mentalities and stereotypes are communicated to girls at a young age through their parents and teachers, sometimes unconsciously. Regardless of the conscious or unconscious nature of the mentalities, these gendered stereotypes shape girls' math attitudes and ultimately diminish their interest in STEM fields. This affects perceived ability to learn in these fields—regardless of whether there is a biological reality to this.
- Students' stereotypes about the culture of these fields—including the kind of people, the work involved, and the values of the field—steer girls away from choosing to enter them. Specifically, researchers studied the stereotypes associated with computer science professionals, information technology professionals, and other STEM professionals. What they found was that while professions under the STEM umbrella seem more male-oriented, they also seem to involve the characteristic of social isolation.
- Specifically, the learned behavior of women is that social isolation is not a valued quality within the female gender. Girls are socialized to be social beings, pleasers, and interactors.
- Also, it was found that women are not historically socialized or taught that they are born with brilliance.

The role of managing classroom dynamics play in promoting female student participation

Is it possible to manage classroom dynamics to reduce the marginalization of female students?

- 1) Are You Certain? Activity
- 2) Discussion points:

Research:

- Peers play a crucial role in women's participation and success in STEM programs. If women are made to feel unwelcome, undervalued or discriminated against, this causes attrition.

Awareness:

- Are faculty aware of students who have experiences of discrimination and oppression based on identities that have been socially and historically marginalized, while also acknowledging identities where these individuals benefit from and receive social power?
- Are faculty aware of how female students are being treated by peers either directly or indirectly, discreetly or through subtlety/micro-aggressions?

Reactive/Proactive Classroom Management Strategies:

- What role do faculty play in ensuring that women are not further discriminated and oppressed based on identities that have been socially and historically marginalized? What strategies need to be in place (and are effective) to prevent and manage observed behaviours?
- How do faculty create space for students to voice their experiences of discrimination and oppression?

Modelling diversity in the field

Does modelling diversity in our field's impact female students?

- 1) Are you certain? Activity
- 2) Discussion points:
 - Studies show that women start becoming interested in STEM at around the age of 11, but their interest begins to wane at 15. This is an important age, as girls are starting to make decisions that will set the trajectory of their academic life.
 - The lack of role models in STEM was identified as the key factor that influenced the girls in the study, as well as a lack of practical experience with STEM subjects at school. On Twitter, 92% of the most followed scientists are male. When women scientists are mentioned in the media, they often tend to be described by their appearance rather than their achievements.
 - Research shows positive benefits for both female student retention, the company (diversity breeds innovation) and social impact
 - How to include role models:
 - When preparing lectures, questions for discussions, scenarios, case studies, assignments, and exams include language, examples, socio-cultural contexts, and images that reflect gender diversity
 - Use voices and ideas of women and others who have been historically underrepresented
 - Promote and use female role models: if you are female, use your own story as a model, if you are male, invite female colleagues, present seminal females in the field and cite work completed by females

The role of using different instructional practices play in promoting female student success

Are there specific instructional practices that promote equal access to learning for both male and female students?

- 1) Are You Certain? Activity
- 2) Discussion points:

1. Encouraging growth and effort as opposed to natural ability when teaching
 - a. Foster a “growth mindset” by conveying the idea that intelligence is not a reflection of fixed, natural abilities, but can change and grow over time
 - b. Praise effort and reasoning to a greater degree than correct answers
 - c. Emphasize process, not just product in your assessments with more formative assessments built in
2. Use varied, student-centered teaching strategies
 - a. Use mixed-ability, collaborative (rather than competitive) group work, hands-on methods, and meaningful (such as real-world and interdisciplinary) contexts.
 - b. Use mixed gender groups, but avoid placing only one girl in a small group, even if that results in having one or more all-male groups. Monitor and rotate these groups regularly
3. Vary instructional strategies to account for differences in learning as discussed earlier
 - a. Provide instruction in two- and three-dimensional visual-spatial skills that involve mental, pictorial, tactile, and kinesthetic tasks. Sample activities include mentally rotating objects to determine what they would look like from another perspective, doing tangram tasks, building and dismantling objects, and physically demonstrating concepts. Variety is key!
 - b. Consolidation activities that link emotion and content and communicative learning strategies combined with more on-task

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