Why Gender Matters:

What teachers need to know about the emerging science of sex differences

Seminar for teachers in grades K – 12

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1) Some sex differences appear to have an innate basis.

Girls and boys see the world in subtly different ways (see *Girls on the Edge,* chapter 5, pp. 134 – 138, for more information and scholarly citations on this point).

Application. *Suppose you are teaching students in early elementary grades. You give all your students a blank sheet of paper and a box of crayons and tell them to draw whatever they want. What do children draw? Studies using this paradigm have found that young* ***girls*** *tend to draw people, pets, flowers, and/or trees, facing the viewer, with lots of detail, eyes, hair, clothes, facial expressions, etc.* →

Boys, on the other hand, are more likely to draw a dynamic scene of action, such as a rocket smashing into a planet, or soldiers shooting at each other. Faces, if visible, are often lacking features. ←

These differences may derive at least in part from hardwired differences in the visual system (again, please see *Girls on the Edge,* chapter 5, pp. 134 – 138, for scholarly citations on this point). Teachers who understand these differences will have boys who love to draw. Teachers who do not understand these differences are more likely to have boys who say, "Drawing is for girls." But the importance of these differences extends beyond visual arts. How we see influences how we read and how we write. Some characteristics of "boy writing" – particularly the emphasis on action – may be traced in part to these differences in the visual system.

Sequence of development. We now know that the various regions of the brain develop in a different sequence in boys compared with girls (see *Boys Adrift,* pp. 17 – 22; please also see my essay for *Psychology Today* December 2010 on recent relevant research from the NIH, "Unexpected sex differences in brain development," www.psychologytoday.com/node/51774, enclosed). This new research demonstrates that **sex differences in the brain diminish as a function of age**. Sex differences in the brain are largest between young girls and young boys; whereas sex differences between adult females and males are small. The same is true for many parameters relevant to education. For example: How long can you sit still, be quiet, and pay attention? We find no difference on that parameter comparing a 40-year-old woman with a 40-year-old man. But when we compare a 6-year-old girl with a 6-year-old boy, we find that the average 6-year-old boy can sit still, be quiet, and *pay attention* for only about half as long as the average 6-year-old girl. He may be sitting still and being quiet, but he is not paying attention. It's common to find 6-year-old boys who absolutely have to stand and make buzzing noises in order to learn. It's unusual to find a 40-year-old man who absolutely has to stand and make buzzing noises in order to learn.

Another important insight from recent research has to do with when we reach full maturity in terms of brain development. Women do not reach full maturity in terms of brain development until about 22 years of age; men, not until 30 years of age. The 15-year-old boy still has a very long way to go. What is developmentally appropriate for a 6-year-old girl may not be developmentally appropriate for a 6-year-old boy; and the same is true for a 15-year-old boy compared with a 15-year-old girl.

If teachers don't understand these differences, the result is girls who believe that "geometry is tough" and some boys who believe that "poetry is stupid." The teacher's lack of awareness of sex differences has the unintended consequence of *reinforcing* gender stereotypes. Conversely, teachers who understand these differences can break down gender stereotypes: they can enable more girls to excel in and to *enjoy* math and computer science, and they can inspire more boys to get excited about creative writing, poetry, and Spanish language.

How to accommodate these differences in the coed classroom? How to allow a 6-year-old boy to stand and make buzzing noises, without distracting his peers? That's the focus of this section.

2) Sex differences are educationally relevant (this next section, on gender-specific best practice for each subject area, occupies most of the workshop)

We will consider applications to these subject areas:

- Best practices for teaching **language arts and English** to girls. Challenging and deconstructing the notion of "girl books": How can you best teach *All Quiet on the Western Front* to teenage girls? How about *Macbeth*?
- Best practices for teaching **language arts and English** to boys. Challenging and deconstructing the notion of "boy books": How can you best teach *The Secret Garden* for 5th-grade boys? How about *Jane Eyre* and *Romeo and Juliet* for high school boys?
- **Computer science for girls.** Based on the work of Professor Caitlin Kelleher at Washington University – St. Louis, in this segment we explore a new strategy for engaging teenage girls in computer science which has been remarkably effective: more than tripling the proportion of girls who use their spare time to work on their computer programming, from 16% to 51%.
- Best practices for teaching **physics** to teenage girls (see *Girls on the Edge,* pp. 132 – 138)
  - The Feynman approach: focus on the *why*
  - The Lisa Randall approach: e.g. the photoelectric effect as the dessert dilemma
  - Why some STEM mentoring programs fail, while others succeed
- Best practices for **modern foreign languages.** There are no sex differences in the *ability* to master foreign languages. But, there are big differences in the best ways to get boys *motivated* to master a foreign language, compared with girls.
- Best practices for teaching **math** to boys, and to girls: For girls, begin with concrete, then move to abstract. For boys: Start with numbers for the sake of numbers. Although one Piaget's basic principles – concrete before abstract – is accurate in most content areas, researchers have discovered just in the past decade that specifically with regard to mathematical concepts, most boys do better if you teach the abstract mathematical principle first, *then* move to the concrete application and the word problems. For example, in teaching how to solve equations in multiple variables, the "boy-friendly"

approach might be to ask: *If x + 2y = 90, and 2x + y = 60, solve for x and y.* The "girl-friendly" approach might be to ask: *If a blouse and two sweaters cost $90, and a sweater and two blouses cost $60, how much does one blouse cost and how much does one sweater cost?* The "boy-friendly" approach is to begin with the equations, then move to the word problem. The "girl-friendly" approach is to begin with the word problem, then move to the equations.

- Best practices for teaching **social studies and history** to girls
  - Begin with "what would it be like to be a girl *your age* living in . . ."
  - Make the connection with the student
  - Examples from the southern United States before the Civil War: what would it be like to be a White girl on a Virginia plantation? What would it be like to be a Black slave girl on the same plantation? Introduce the narrative history only after the connection is made, and interest is engaged.
- Best practices for teaching **social studies and history** to boys
  - Use narrative history as a vehicle to engage boys, and then make the pivot into social studies.
  - Why is historical fiction less reliably effective with middle-school *boys* – even though adult *men* love it?
  - *In medias res:* why it sometimes makes sense to start "in the middle of things"
  - Emphasize technical elements, and maps: What was the difference between a Confederate rifle and a Union Army rifle? Why did it matter?

3) Some girls and boys don't fit the usual stereotypes.

Some girls don't want to play with dolls; they'd rather kick a football or wrestle a hog. Some boys don't enjoy football or hockey; they'd rather read *Twilight*. Research by Jerome Kagan, Patricia Cayo Sexton, and others, has demonstrated that these boys share a number of characteristics which distinguish them from 'mainstream' boys (for the relevant scholarly citations, please see *Why Gender Matters,* chapter 9):

- These boys may be athletically talented, but if so, they tend to prefer tennis, track, or golf, rather than football or soccer
- These boys are more likely to suffer from allergies, asthma, and eczema
- These boys are more likely to be precocious, particularly with regard to language
- These boys are NOT more likely to be homosexual. Sexual orientation is an independent parameter.

What do educators need to do to ensure that all boys – including these boys – fulfill their potential? And what about gender-atypical girls, a.k.a. "tomboys"? How do the principles described above differ for these girls – if they *are* different?

4) Best practices for classroom management and motivation – for boys.

A. **The team-competitive format in the classroom.** We will review how to introduce team competition within the classroom, how to assign students to the various teams, how to address differing abilities among the various teams, how implementation at secondary school differs from implementation in elementary school, and how to implement team competition in a way which reliably motivates girls as well as boys.

B. **Bullying prevention.** The traditional approach – some variation on "*How would you feel if someone did that to **you**?*" – doesn't work very well in preventing boy-on-boy bullying. What *does* work?
C. **Eminem *vs.* the Gentleman.** It's not sufficient for a boy to become a man; we want him to become a *gentleman,* i.e. a man who is courteous, responsible, and genuine. How to create a classroom in which it's "cool" to be a gentleman?

5) Best practices for classroom management and motivation – for girls.

We will discuss the advantages and disadvantages of various seating arrangements, how to encourage group work without promoting the formation of cliques, and the difference – in girls' eyes – between *teammates* and *friends*. We will consider specifically **preventing the "Meangirls" phenomenon.** This strategy, developed initially at an independent school in Illinois, the Woodlands Academy of the Sacred Heart, has been effective in preventing girl-on-girl bullying in coed schools across North America (see *Girls on the Edge,* pp. 147 – 154).

For more information about Dr. Leonard Sax, please go to www.leonardsax.com.