eBrief
Research summary for principals

Alliance of Girls' Schools Australasia

Linking brain research to classroom practice

Issue 19/2022: November 17, 2022

A recent webinar hosted by the Alliance on the topic The brain in the classroom: Fad or foundation? presented by Dr Jared Cooney Horvath, educational neuroscientist and brain researcher, highlights the disconnect between neuroscience and the classroom. This is not a new issue and classroom practitioners who have knowledge of the underlying neuroscience, can be enabled to make good use of what has been learnt about our brains (Willis, 2008). Cooney-Horvath, explains that by understanding better how the brain functions, this will in turn help educators to better understand how students learn.

Cooney-Horvath suggests that despite decades of effort trying to marry scientific insights with classroom practice, very little (if anything) has changed in education. He dispelled and explained how so many current and popular 'brain differences' between the sexes are false, making it clear that there were no biological differences in female and male brains. Far from suggesting that the lack of evidence for gender difference in the brain translated into a lack of support for teaching strategies tailored to the way girls or boys learn, Cooney-Horvath was quick to point out that there are important gender differences in social development that educators need to consider. Boys and girls interact differently during adolescence. Cooney-Horvath says girls tend to form strong dyad relationships, and have a 'best friend'. Boys, on the other hand, tend to have a crew of five or six friends rather than one best friend. Another significant difference is how boys and girls respond emotionally, most notably to stress in adolescence. Cooney-Horvath suggested *"girls report chronic stress 80 per cent more than boys".* Socialisation is also a cause of major differences. Boys and girls learn to respond differently in the social interactions which entwine their lives and shape their school experiences. This alone is a powerful indicator that girls will thrive and learn better in a girl friendly learning environment, likewise for boys. While we must be cautious not to over generalise the differences between girls and boys, there is a weight of research that supports an approach to girls' learning needing to be girl friendly (Younger, 2016).

Younger articulates that effective pedagogy for girls is characterised by:

- Lessons which have a clearly visible structure;
- A high level of involvement and interactivity, a focus on talk, and a willingness of the teacher to create a collaborative learning environment;
- An acknowledgement that interactivity does not always mean frenzied activity and variety;
- The creation of a sense of confidence and security for the learners, so that girls are willing to learn from each other, to take risks and explore;
- The development of a collaborative partnership between learners and teacher, fostering independent learning but within a secure and challenging environment;
- An awareness that however confident girls appear, teachers need to take time and space to reassure, even when girls seem less confident in their own abilities than they ought to be.

Research conducted in the Czech Republic by Happe and Buhnova presents strong evidence that a significant issue regarding the under-representation of girls within software engineering is largely due to inappropriate pedagogy (Happe, 2020). In their paper, they collected effective strategies for building a girl friendly classroom environment that is inclusive towards novice computer science learners. They recommend the following girl friendly classroom design characteristics:

- Creating a safe environment-using strategies to minimize competitive culture, which often feels threatening to girls
- Segregation-main goal of segregation is to provide girls with a fair share of instruction time
- Working in teams-collaboration and teamwork can be used to increase the engagement and participation of girls
- Personalised learning-goals of personalised learning are to: provide self-efficacy interventions if needed; calibrate self-evaluation of girls by encouragement and feedback; and limit frustration.

Cooney-Horvath argues the process of learning is identical for boys and girls and in light of this, he says there are some major considerations that can be translated from the laboratory to the real world.

1. **Students cannot multitask**. We can only focus on one task at a time, and learning will not be as effective if students are doing multiple things at once or flipping in short succession between tasks. *"The single worst thing we can do for learning and memory is multitasking. A student who studies for 50 minutes without any multitasking will learn up to 30 to 70 per cent more than another student who studies the same material for four hours while multitasking."*

2. **Teens and Tech**. Technology is not good for relationships. *"When you do relationships 'live' the body releases oxytocin which makes you feel close to another person. When you use digital technology, your body releases tachykinons which are a pre-curser to depression. When students use social media for extended periods it makes them feel lonely. The more technology is used the more it pushes students to feeling more stressed and can lead to depression."*

A final issue to consider is while the biology for boys and girls is the same regarding changes to the brain as we age, Cooney-Horvath argues boys and girls respond to these changes differently. Our culture socialises boys and girls differently. Cooney-Horvath says women respond at a younger age to these *changes "it is during puberty when the brain changes and it is acquisition of adult responsibilities which turns off the changes to the brain. Do women assume responsibility sooner?"* Yes, is Cooney-Horvath's answer. *"In Western societies, girls act like women, before boys act like men".*

It is unsurprising, that many schools offer unique programs in the middle years of schooling, especially for Year 9 students. The range of school programs which require students to reside in a remote residential setting for periods of a few weeks up to a year are not uncommon in schools. For this age group, schools also offer challenging outdoor education experiences, and a vast array of school campus programs are designed to provide challenge, offer choice, and focus on developing community, independence and responsibility. Cooney-Horvath states *that "our job, as parents and teachers, is to get teenagers ready for life and if we don't do that, we stunt their development."* The implication for schools, is they need to engage with students in ways which respond to these developmental changes common to adolescence.

In the webinar Cooney-Horvath identified how pedagogies compatible with neuroscience research can benefit both girls and boys. All schools purposefully and deliberately design and implement teaching and learning strategies to support their students. In girls' schools this means teaching tailored to specifically meet the different needs of girls — addressing gendered socialisation and social development.

References

ASCD. (2004, November 1). *With boys and girls in mind. ASCD*. Retrieved November 13, 2022, from https://www.ascd.org/el/articles/with-boys-and-girls-in-mind

Cooney-Horvath, J. (2022). *The brain in the classroom: Fad or foundation?* Retrieved November 12, 2022, from https://www.youtube.com/watch?v=MMQHfALvCWM

Goldman, B. (2017). *Two minds: The cognitive differences between men and women.* Stanford Medicine Magazine. Retrieved November 12, 2022, from https://stanmed.stanford.edu/how-mens-and-womens-brains-are-different/

Happe, B. B. (2020). *Girl-Friendly Computer Science Classroom*: Czechitas Experience Report. *ResearchGate*. Retrieved November 11, 2022, from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.researchgate.net/profile/Barbora-Buhnova/publication/344273671_Girl-Friendly_Computer_Science_Classroom_Czechitas_Experience_Report/links/5f69df9092851c14bc8e0966/Girl-Friendly-Computer-Scien

Momentus Institue. (2018). *Boy Brains And Girl Brains: What's The Difference?* Momentous Institute. Retrieved November 10, 2022, from https://momentousinstitute.org/blog/boy-brains-girl-brains-difference

Willis, J. (2008, February 1). *Building a Bridge from Neuroscience to the Classroom*. *Phi delta Kappan*, pp. 424-429.

Younger, M. (2016). *Effective pedagogies for girls' learning a review of recent research.* Girl's day School Trust.