

Structured Pairing Overview

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What:

- Structured pairing is a way of organizing working groups in engineering laboratories. It is based on the pair programming tradition in computer science, but modified to better suit the working conditions of engineering laboratory courses.
- In structured pairing, students take turns as the *driver* and the *navigator*. The driver operates all lab equipment (e.g., the computer, measurement equipment, hardware, etc.), while the navigator takes notes and measurements, keeps the pair on task, and asks reflective questions.
- Both members of the pair make decisions collaboratively, share perspectives, and plan any code or designs. Students switch roles at designated switch points, about twice per lab.

Why:

- Structured pairing was developed to help both students in a lab pair remain active and engaged during all phases of the lab and ensure that everyone has an opportunity to develop hands-on expertise.
- In a study of structured pairing in a first-year ECE laboratory course, structured pairing:
 - Increased student comfort with basic hands-on laboratory tasks
 - Increased students' satisfaction with the course, department, and labs
 - Increased students' conceptions of effective collaboration between lab pairs
 - Resulted in equivalent task distribution between lab pairs
 - Resulted in effective co-learning through reciprocal scaffolding

A Bit More About Structured Pairing:

- Each role has a specific set of responsibilities and required characteristics:
 - A driver is...
 - Hands-on – operates equipment/hardware, enters code
 - Descriptive – explains what they're doing and why
 - Inclusive – Listens to the navigator's questions and guidance
 - A navigator is...
 - Process-oriented – ensures that the pair stays focused and on track
 - Reflective – reflects on the process and outcomes and asks questions
 - Organized – takes thorough notes and measurements
 - Attentive – pays attention to what the driver is doing and offers guidance/asks questions
 - Both teammates are...
 - Collaborative – plan process, make decisions, and develop any code/designs together
 - Engaged – participate equally and share their ideas and perspectives
- Groups of three might occur in a section with an odd number of students. While pairs are preferred over triads, groups of three should have two navigators at a time. Every member of the group should spend at least one section as the driver.

Further Reading:

Fila, N.D., & Loui, M. C. (2014). Structured pairing in a first-year electrical and computer engineering laboratory: The effects on student retention, attitudes, and teamwork. *International Journal of Engineering Education*, 30(4), 848–861.