

A video-guided web platform for specimen preparation in postgraduate mechanical engineering education

RJC Carbas (University of Porto, Portugal) | EAS Marques | LFM da Silva

Watching a demonstration once is not the same as being able to do it

At MSc level, the gap between observing a demonstrator and preparing a test specimen successfully can be large. This work gives students short videos they can go back to, so they can review what they did or missed.



Why specimen preparation goes wrong

Bridging the gap between a live demonstration and an independent skill comes with challenges. Key factors include:



Timetable pressure and restricted laboratory time

Few contact hours to watch and practise.



The inconsistency of live teaching

No two in-person demonstrations are the same.



Outcome: Avoidable

Students cannot go back and review their work, or see what they missed.

A very simple concept

Short instructional preparation videos with summaries allowed independent, self-paced student progression and on-demand review throughout the course.



1 Watch

a short video of each preparation step



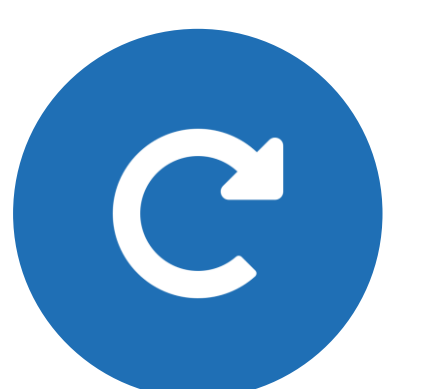
2 Read

the brief description that goes with it



3 Do

work through the steps independently



4 Return

review again whenever it is needed

Developed interactive application modules

The platform organizes practical guidance into three manufacturing themes for joining processes. Scan the QR codes to access each module.



Scan to open

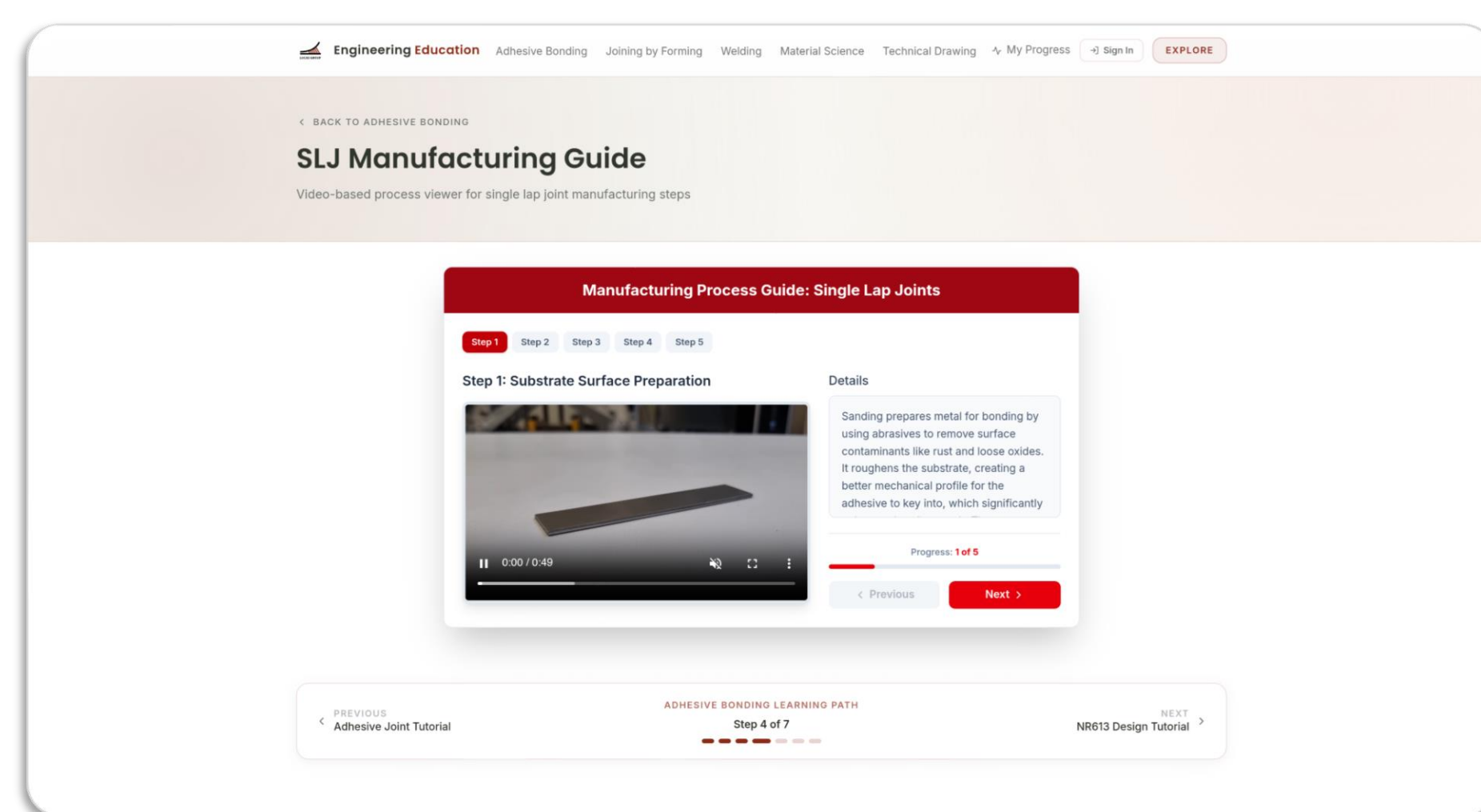


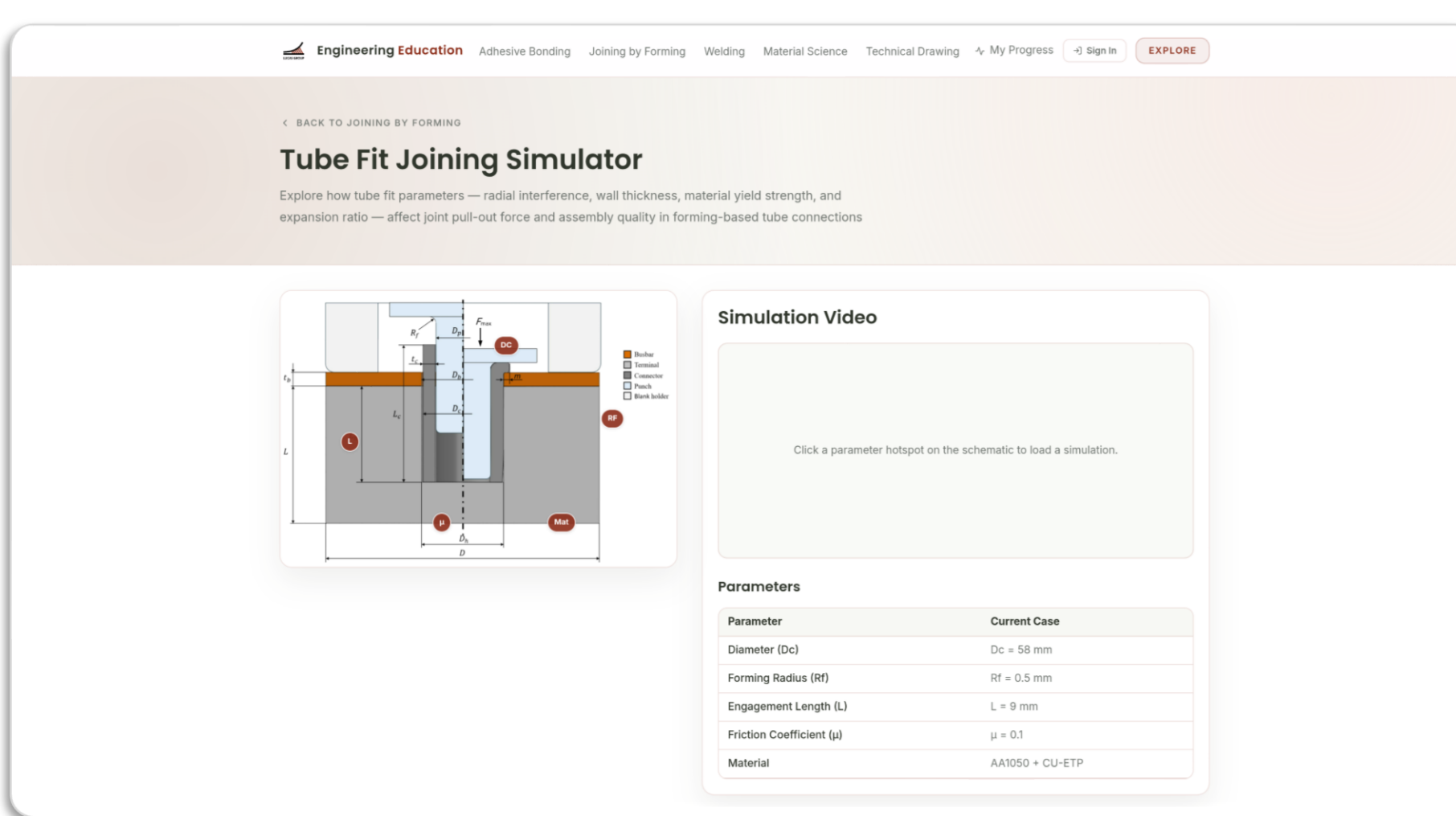
Scan to open

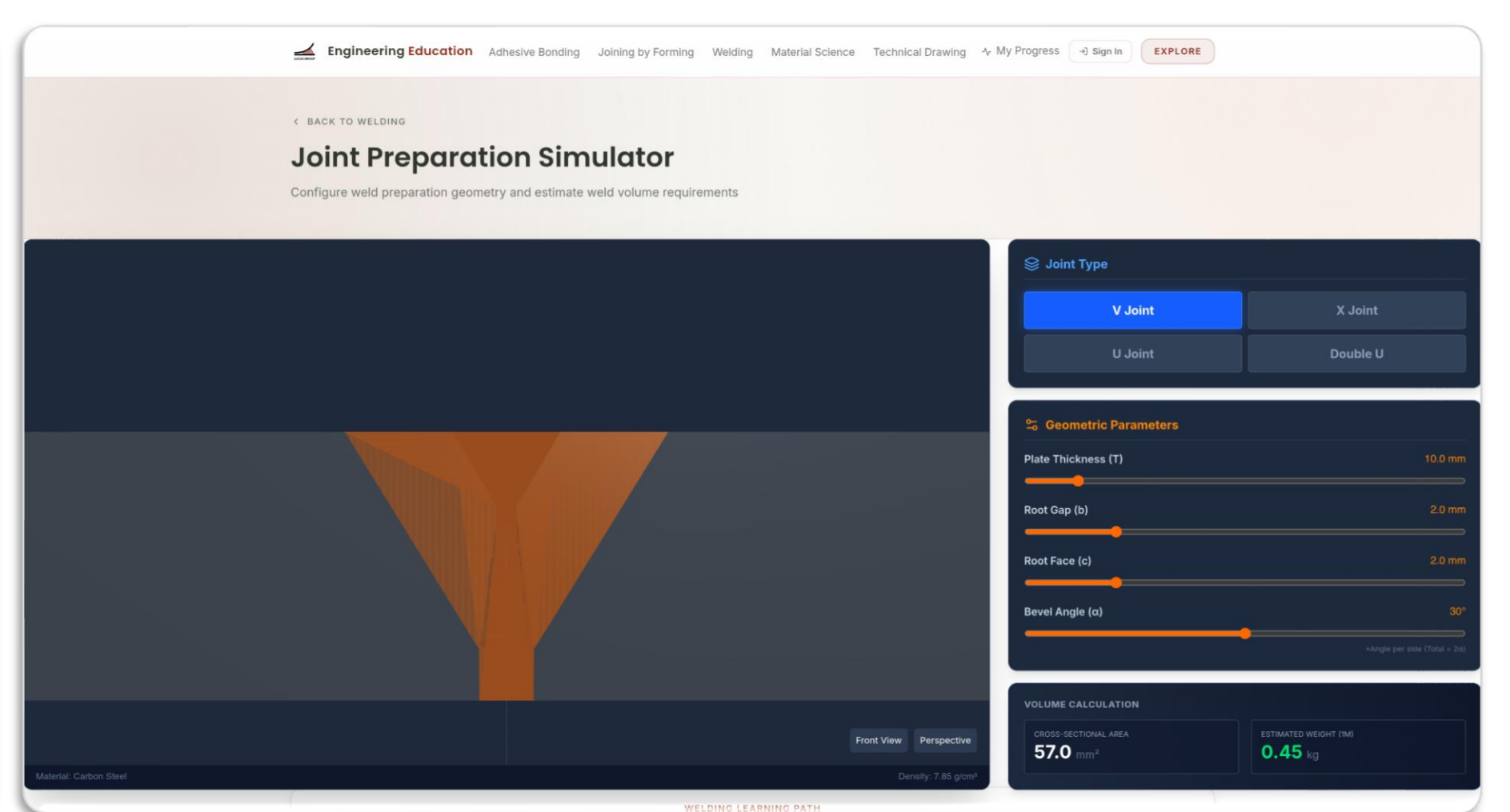


Scan to open

Selected interactive modules across adhesive bonding, joining by forming, and welding:







Benefits in the lab

Initial reactions from students have been positive.



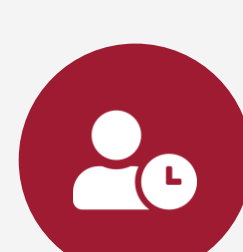
More prepared

Students arrive at lab sessions ready to start.



Fewer mistakes

Steps can be reviewed before and after trying them.



Less supervision

Limited contact hours go further.



More confident

Video and live demonstration builds confidence.

Future expansion

- **Additional video-guided modules:** Testing and analysis.
- **Continuous pedagogical evaluation:** Tracking student competencies before and after web-tool integration.
- **Cross-course scalability:** Establishing a simple, adaptable framework for other courses.