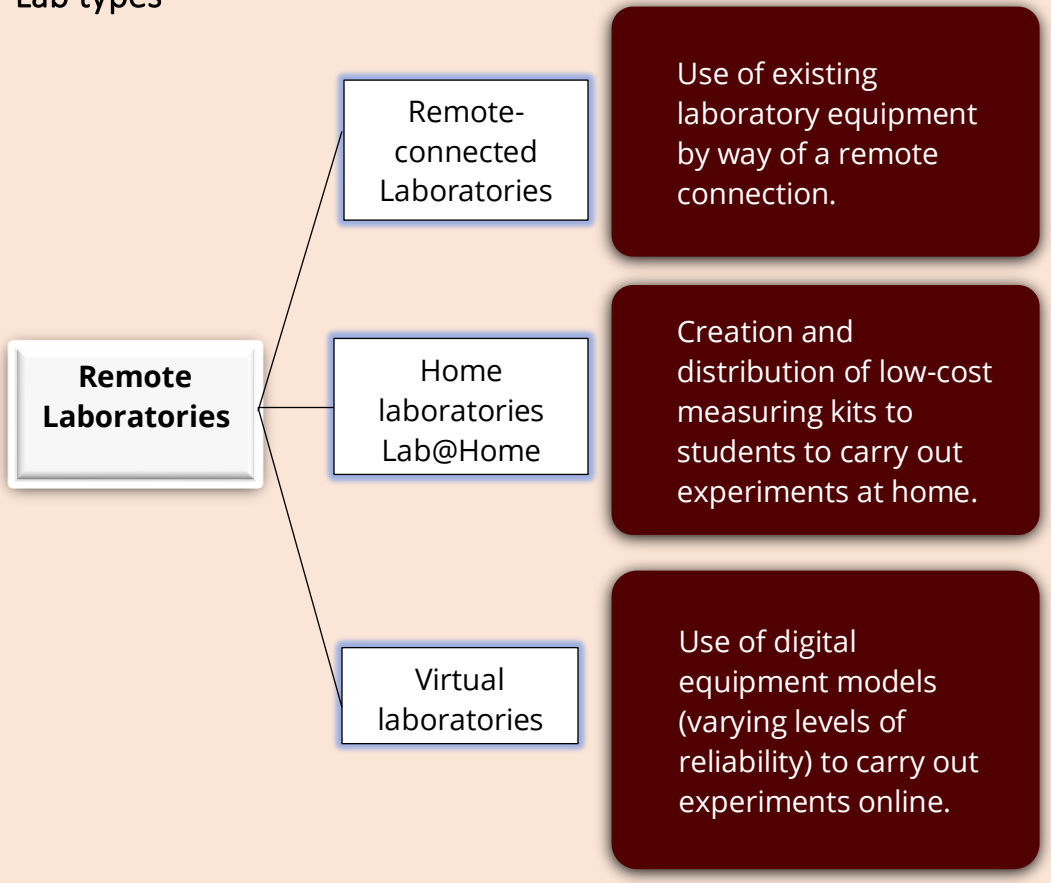
An Quick Guide to
Remote Laboratory Instruction and Different Possible Formats

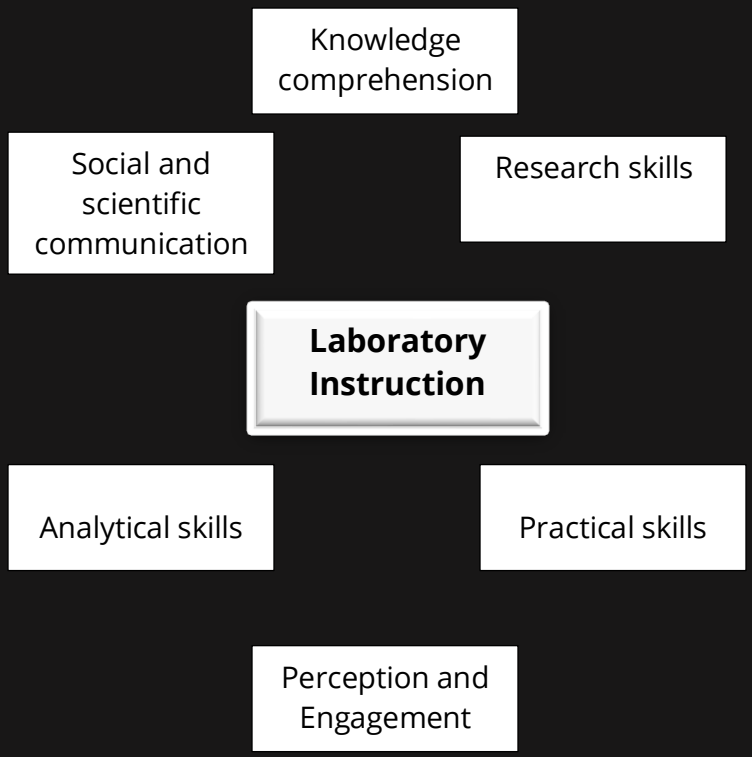
In scientific and technical instruction, laboratory work is an essential activity for skills development. Laboratory work requires a lot of time, space and materials.

The arrival of COVID-19 has caused all administrations to revist the relevance and necessity of online practical work (PW).
The following video (in French) provides a quick overview of the issue. https://youtu.be/IcGJnjfHxnc

Lab types



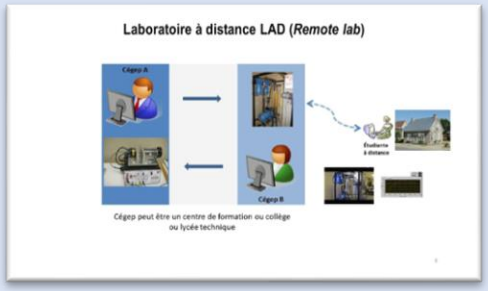
Material learned in labs

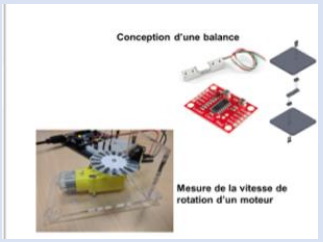


Learning outcome achievement in non-traditional (virtual and remote) versus traditional (hands-on) laboratories: A review of the empirical research, James R. Brinson

ANALYSIS OF LABORATORY TYPES: ADVANTAGES, DISADVANTAGES AND PRACTICAL TIPS

	Advantages	Disadvantages	Practical Tips

Remote-connected laboratories	• **Uses real materials.**
	• **Credibility and confidence in the results, real-life controls.**
	• **Low-cost (one piece of equipment on which students take turns).**
	• **Limited needs in terms of space and resources.**
	• **Flexible planning.**
	• **Possibility for remote manoeuvres:**
	  ○ On-site technician
	  ○ Member of the student team
	  ○ Remote equipment operation
		• **Limited practical skills in equipment operation.**
		• **Digital and software infrastructure for remote communication to be implemented.**
		• **Security measures to be considered.**
			
			Must be preceded by a video demonstration and preparatory work to guide students and ensure instructions are properly followed during the allocated connection time.★
			RL used between CEGEPs https://youtu.be/BhlUJDSig1I

Home Laboratories (Lab@Home)	• **Credibility and confidence in the results, real-life controls.** • **Limited costs/Flexible planning.** • **Lightens the institution's mobilization.** • **Lab@Home:** https://youtu.be/LaQUOjtufjM https://youtu.be/dLI7jEVyc6c	• **Investment to acquire and prepare student kits.** • **Kits are not available for all types of laboratory work.**	  • **Appropriate remote training must be provided.** • **The kit can be used for other projects after the initial project.★**
Virtual laboratories	• **Minimal cost.** • **Low risk for manipulation and use.** • **Flexible planning.** • **Project PhET:** https://phet.colorado.edu/	• **Students don't work with real materials.** • **Insufficient for showing the limits of theoretical models.** • **Lack of credibility and confidence in the results.**	 • **Interesting for testing laws and simulations.** • **To be completed with another laboratory model.★**

★ These strategies follow best practices and are generally recommended for all courses and exams.

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