



Mixed Reality Brings Science Concepts to Life

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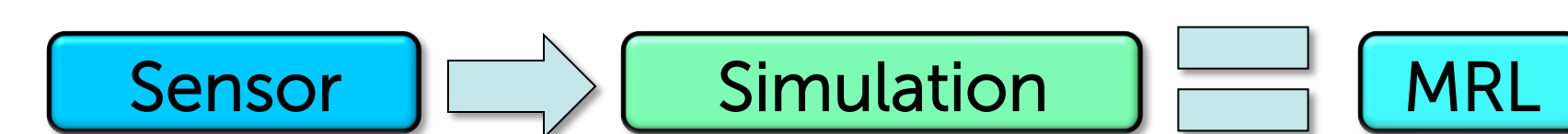
"Conception without perception is empty; perception without conception is blind... The understanding can intuit nothing, the senses can think nothing. Only through their union can knowledge arise."

— Critique of Pure Reason, Immanuel Kant

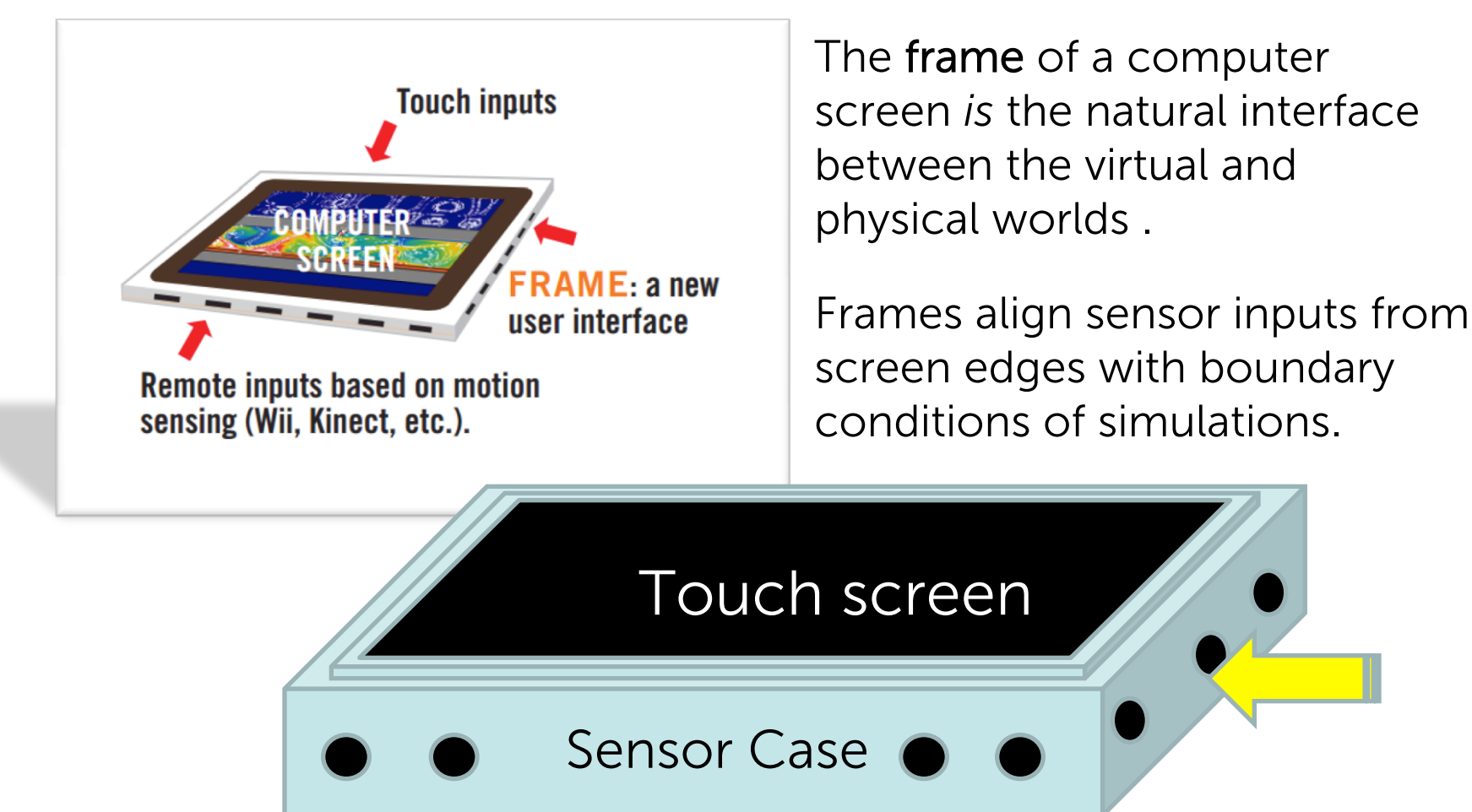
Mixed reality refers to the integration of real and virtual worlds to create new environments where physical and digital objects coexist and interact in real time to provide user experiences that are impossible in either the real or virtual world alone.

Cognitive Perspective

Mixed-reality labs (MRL) couple perception and conception by using sensor inputs to drive simulations.

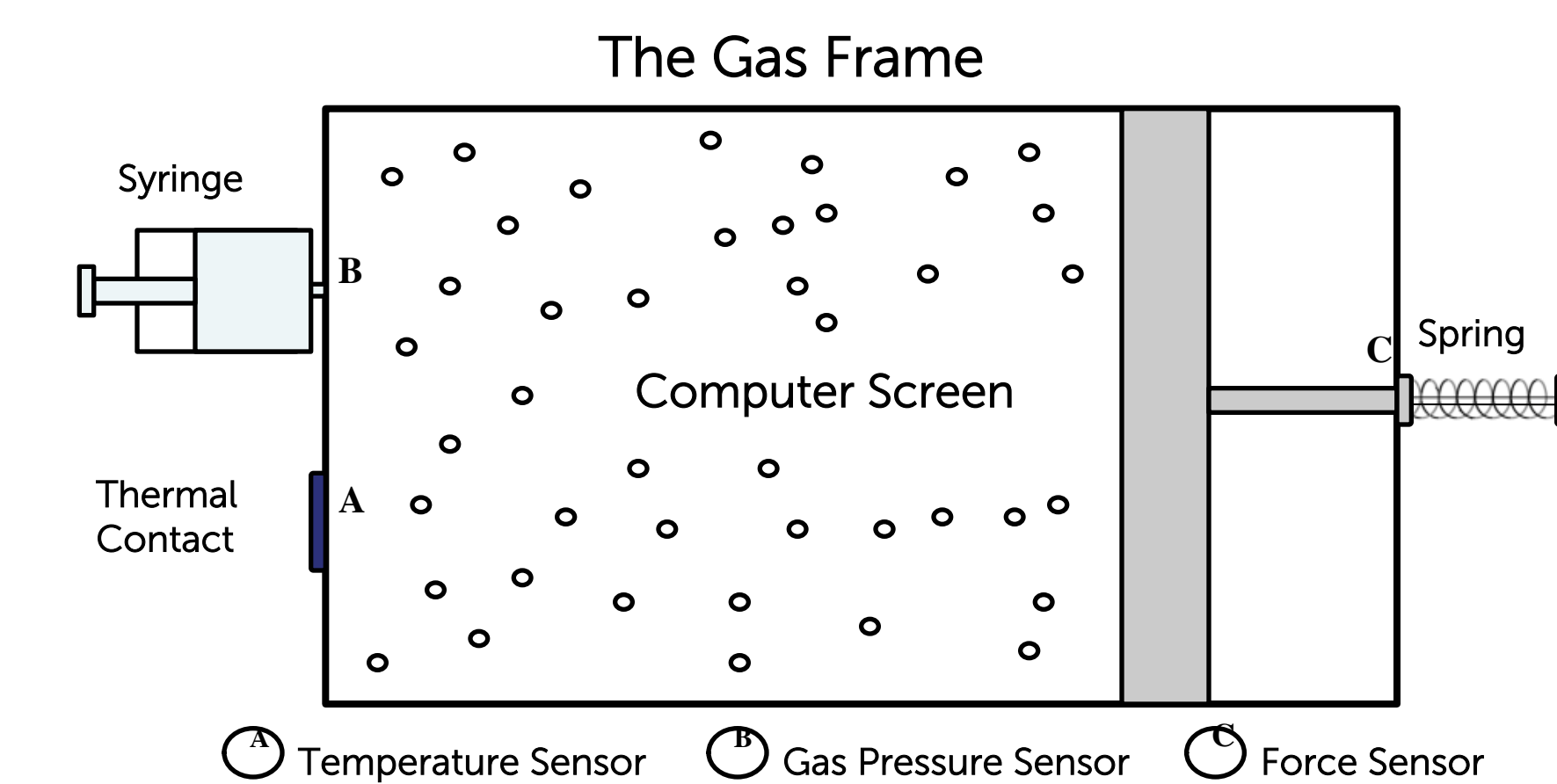


Frame: A Natural User Interface



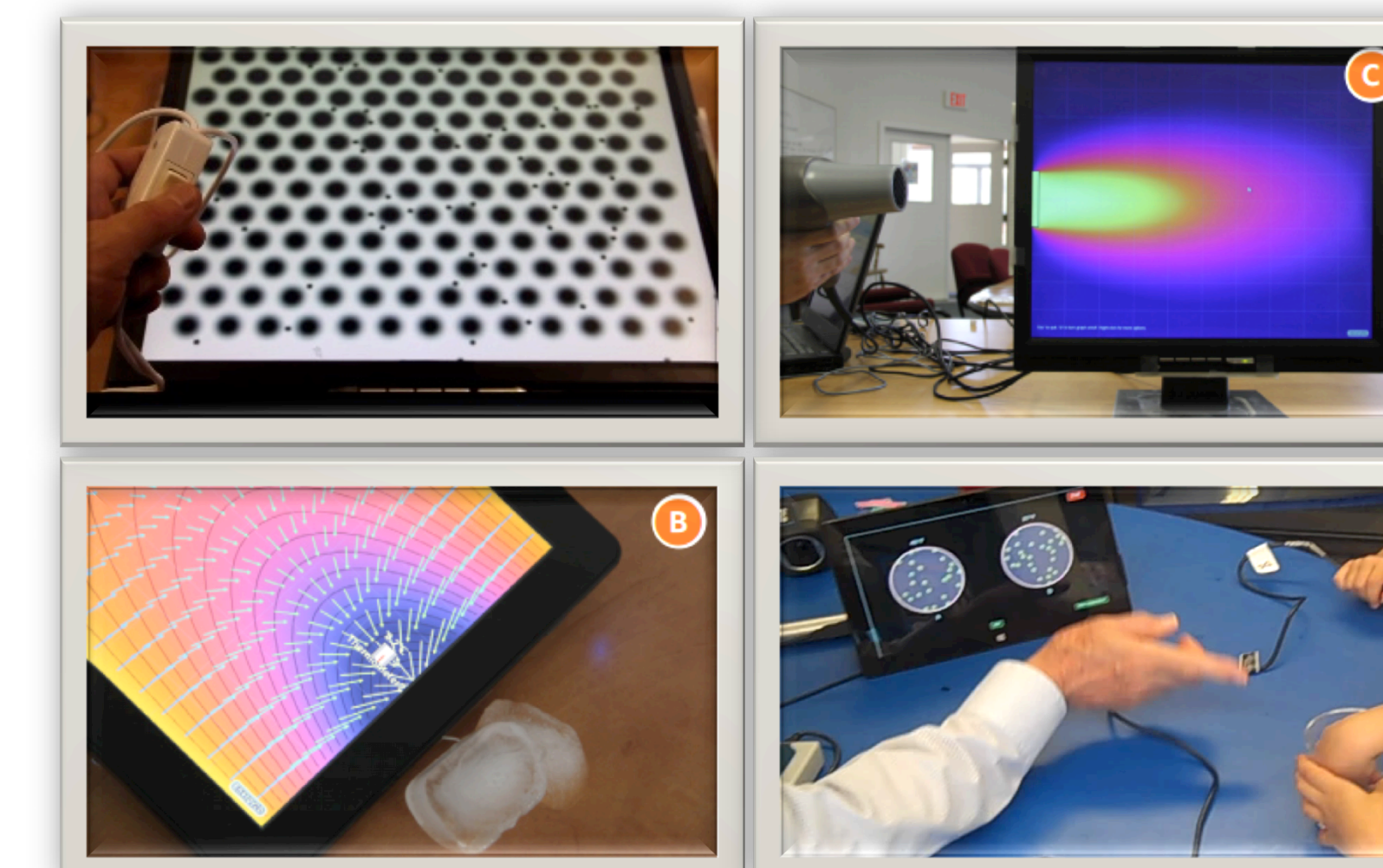
Applications

A new way to teach gas laws

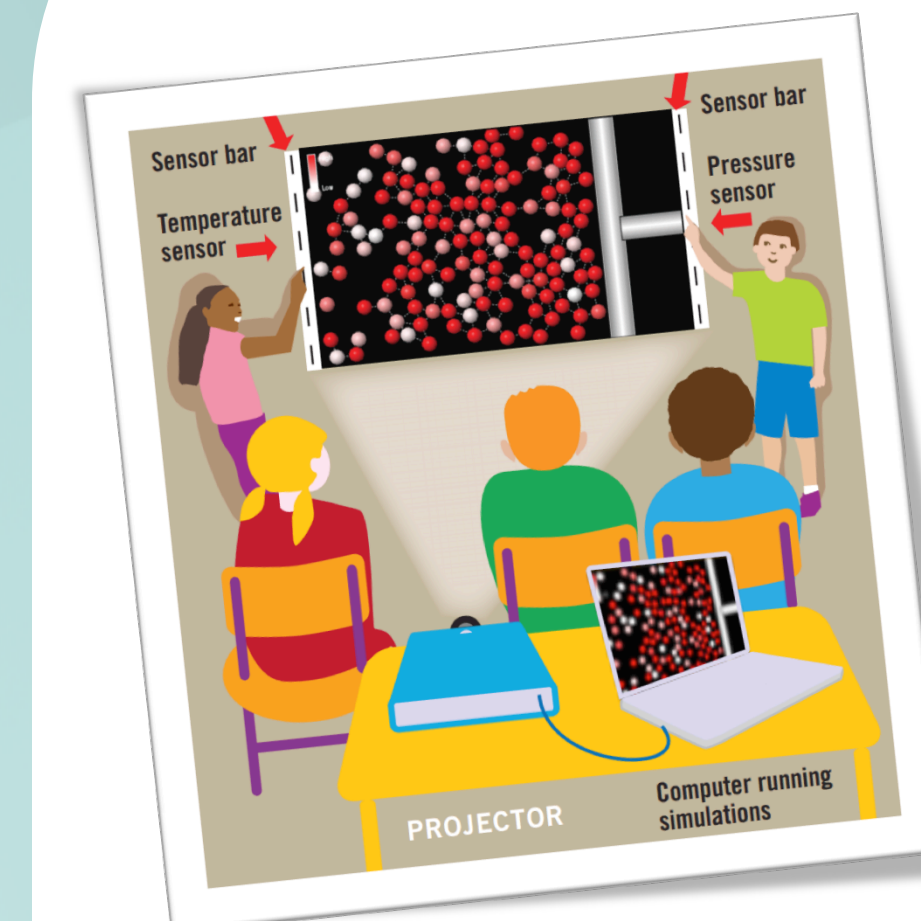


Mixed-reality "thermal imaging," Thermoscope, etc.

Other Frames



Student Reactions



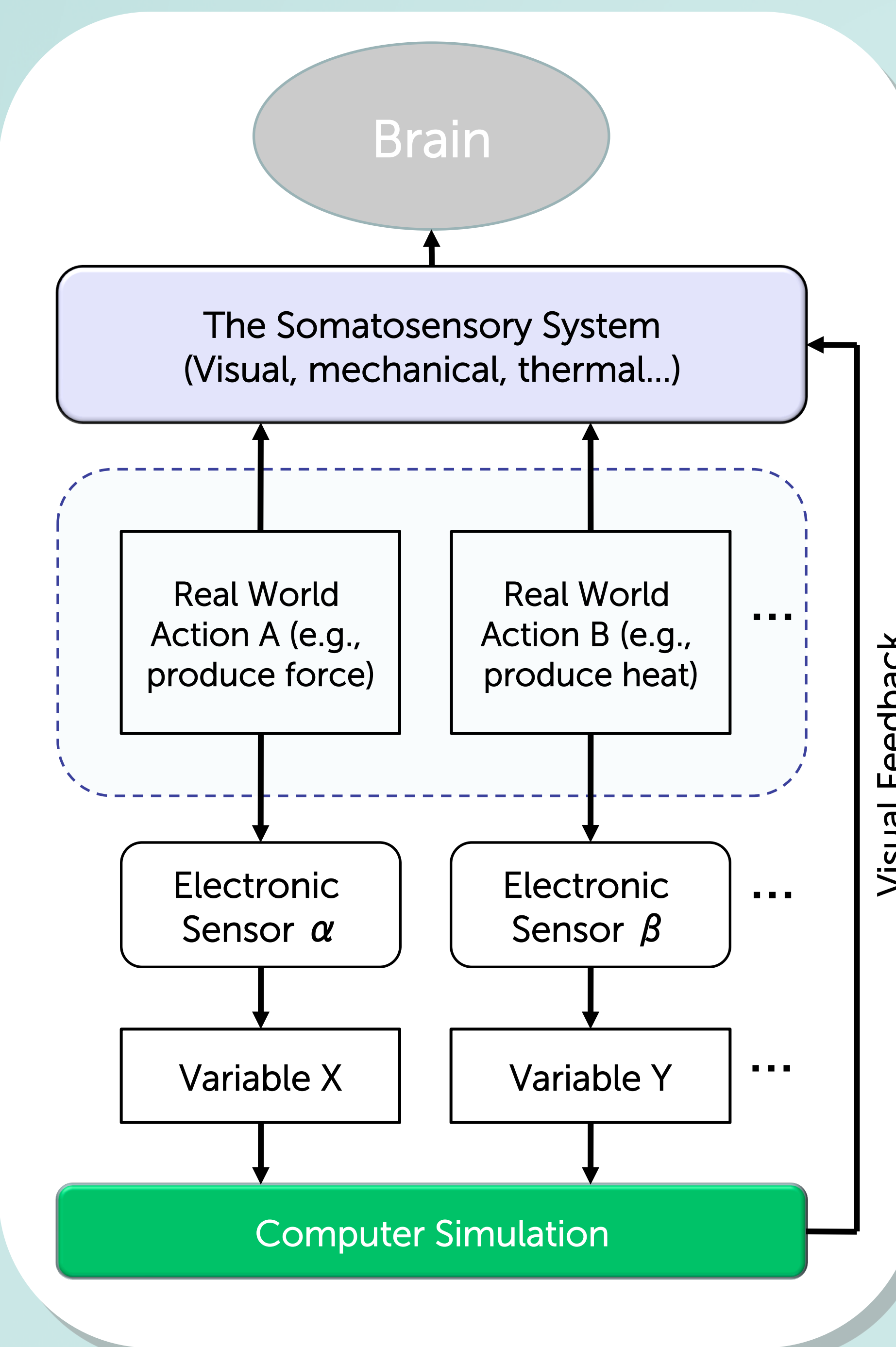
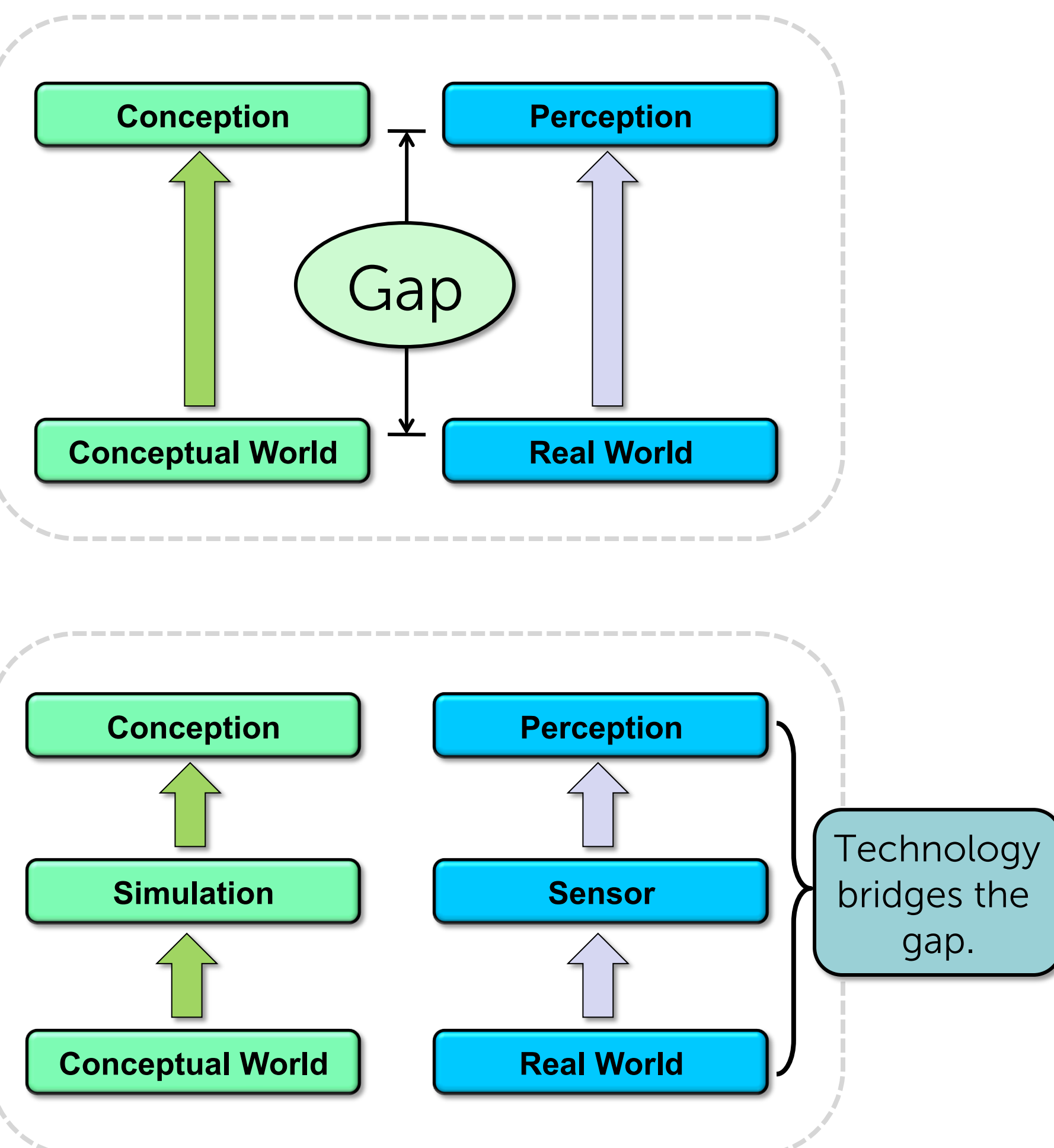
■"It was very interesting to be able to play around with the computer. The technology was very advanced and made the experiment more enjoyable."
■"I liked the interactive materials such as the spring and the touch pad to change the temperature. These provided us with tangible objects that changed what was happening on the screen, and it made it more engaging, and thus easier to learn from."

■"The gas frame made it much easier to understand the air around us isn't just empty space. It provided the background for why the books functioned the way they did in the experiment. In addition, because we could seemingly physically change the temperature, pressure, and volume, the experiment resonated more than if we simply clicked buttons on a computer."

Student "approval rate" (based on 55 anonymous votes)

6. Based on your experience, would you recommend other classes to use the Gas Frame?			
	Response Percent	Response Count	
Recommended	68.5%	38	
Neutral	23.6%	13	
Not recommended	7.3%	4	
answered question		55	
skipped question		0	

Perception and conception can be enhanced using educational technology that visualizes the unseen world and abstract concepts.



Project website: <http://mrl.concord.org>