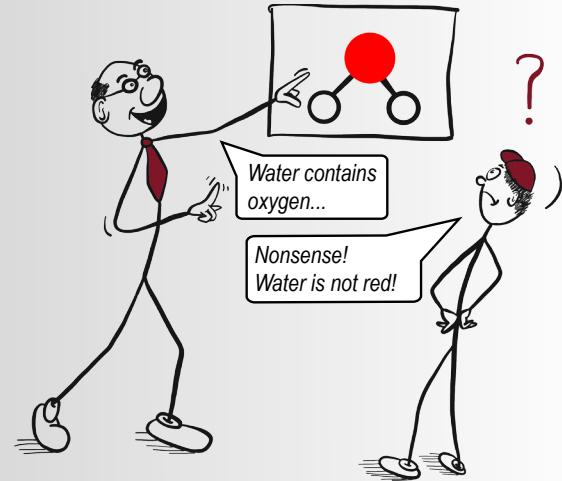


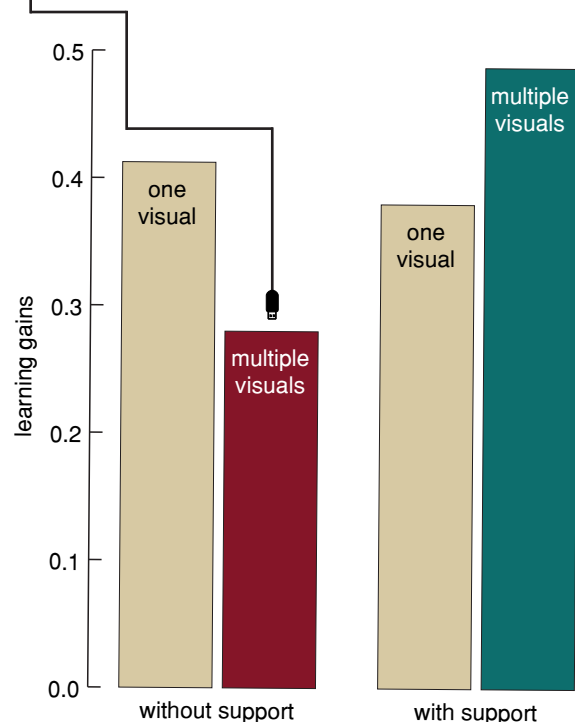
Technology-Supported Learning with Visuals

Visuals Can Confuse Students



Common Practice is Does Not Help Students Learn!

Common instruction uses multiple visuals. But if students don't know how the visuals show information, they don't benefit from visuals. Therefore, they need support for visual skills.

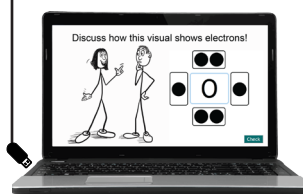


Technology Support for Visual Skills

Educational technologies offer interactive visuals that students can construct and manipulate to solve problems. Students' interactions with these visuals yield data that the technology can use to diagnose students' visual skills in real time. Based on this diagnosis, the technology can provide support that is tailored to the student's needs. Besides helping students learn the visual skills themselves, such personalized supports increase students' learning of the domain knowledge.

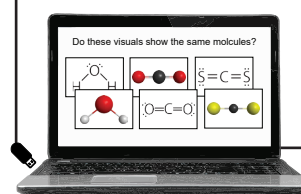
Social Support

Students need to use visuals to collaborate with other students. Technologies can support students in using visuals to collaborate with others by prompting them to discuss how the visuals show information and by supporting effective communication, and by assisting students in helping one another.



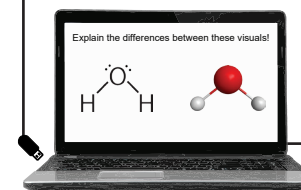
Perceptual Support

Similar to fluency in a verbal language, students need to become fluent in a visual language: they need to automatically see meaning in visuals. Technologies can support this fluency by asking students to sort and classify visuals while providing real-time feedback and select appropriate example sequences.

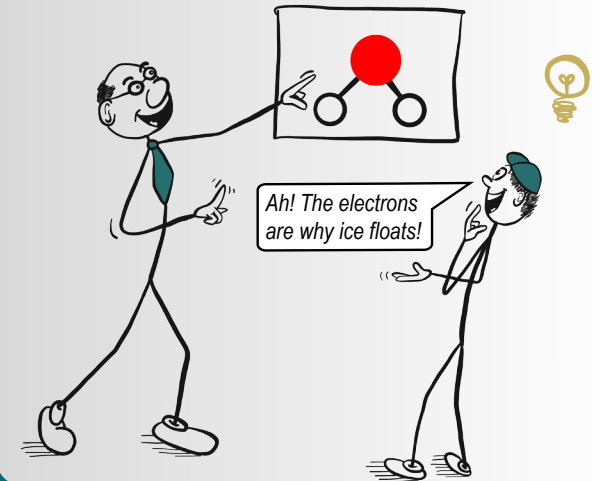


Conceptual Support

Students need to understand how visuals show concepts. Technologies can help students explain which visual features show which concepts and how different visuals compare to one another by giving feedback on students' explanations.



Visuals Can Enhance Students' Learning



Personalized Visual Support Helps Students Learn!

Visual skills determine which visual support is most effective. If students have low visual skills, they need conceptual support; if they have high visual skills, they need perceptual support.

