You can improve your spatial skills with training: study

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A new CIRES-led study found that you, too, can improve your spatial reasoning with practice. Credit: Students by ©Jisc and Matt Lincoln; rocky anticline CC by Juan Antonio Cordero; others by CIRES

Do you marvel at your friend's ability to assemble complex IKEA furniture and navigate a new city, or do you all-around groan at your own lack of spatial skills? Don't fret! A new CIRES-led study found that you, too, can improve your spatial reasoning with practice.

Spatial reasoning skills are critical in many scientific disciplines, from archeology to environmental engineering. And the authors of the new study, published today in the *International Journal of Science Education*, hypothesize that providing formal spatial training opportunities for

undergraduate students could increase the pool of students who go on to succeed in geoscience careers.

"Spatial skills are so crucial in the geosciences," said Anne Gold, lead author of the study and director of the CIRES Education & Outreach program. "Reading a topographic map, deciphering how erosion sculpts landscapes, or recognizing how elements are arranged within a mineral all demand spatial visualization and reasoning."

For the new work, the team provided training exercises to 326 undergraduate students enrolled in Geology courses at CU Boulder in 2014 and 2015. Students completed short, weekly practice modules, both online and hands-on, that focused on specific, discrete spatial skills.

The online training included exercises like mentally rotating geometric figures or imagining the shapes that result when a plane slices through different objects. The hands-on activities included building and drawing block figures and cutting through geometric shapes built from modelling clay. A group of 266 students served as the control group, receiving no training.

After one semester, 70 percent of the trained students increased their spatial skills, scoring better on a written assessment as compared to a pre-training assessment and when compared to the students who didn't participate in the trainings.

On a reflection survey, half of the trained students reported they felt their spatial thinking skills improved, and more than one-third found the training boosted their performance in other science classes.

The study builds upon the research team's earlier work showing young adults who played with construction-based toys such as Legos, or with certain types of spatially challenging video games, outperformed other

peers in tests of spatial reasoning.

"At any age, from childhood to college-age, and even well past that—it's possible to sculpt your spatial skills," Gold said. "It's never too late."

Including spatial training in schools could increase the pool of students who go on to choose and succeed in the geosciences, said Gold. And the students involved in the new assessment identified personal benefits, as well.

"The modules forced me to change my perspective on the object which I was observing, which is a valuable skill," said one of the student participants in a reflection survey. "It challenged my brain to work in complex ways it otherwise wouldn't," said another.

More information: Anne U. Gold et al, Improving spatial thinking skills among undergraduate geology students through short online training exercises, *International Journal of Science Education* (2018). DOI: 10.1080/09500693.2018.1525621

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