Educating searchers

Imagining the Future of Undergraduate STEM Education
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https://youtu.be/oeZujyqCv_s

What should undergraduate STEM education look like in 2040 and beyond to meet the needs of students, science, and society? What should we do now to prepare?

Today's undergraduates grew up with all the world's information instantly searchable. Every curiosity, profound or mundane, has been within their reach from birth. They can search from any location at any time using their fingers, voice, or camera. They only need questions to ask.

Artificial intelligence (AI) and augmented reality (AR) are maturing quickly. Inherent in AR is simulation of the real world, augmenting reality with associated information and fanciful possibilities. Infants today will grow up with devices that comprehend them and enhance their world to entertain and inform them. By the time they reach college in 2040, undergraduates will have AI and AR as integrated into their lives as search is today. They only need ideas to explore.

The role of undergraduate STEM education in 2040 cannot be to provide information—students already have the world's information in their pockets. Its role cannot be to assign problem sets—students will have devices capable of completing them. Instead, the role of undergraduate STEM education in 2040 must be to virtually guide students through unexplored corners of their world, encouraging them to ask questions and discover answers.

A chemistry professor invites students to examine ordinary objects using AR to zoom down to the molecular level with simulations of bonds and interactions. A biology professor has students see through their own skin to watch internal processes in action. A civil engineering professor takes students on a field trip to a nearby overpass where students simulate load conditions and traffic. An astrophysics professor dims the lights as students peer into the night sky, zooming into star formations and colliding galaxies. In every case, students are encouraged to explore, ask questions, reveal the underlying mathematics, and code experiments to learn and discover.

The engaging experience of self-discovery using AI, AR, and search guided by experts is already coming together today. We can enable and accelerate these future classrooms by embracing AI and AR for education, integrating simulations of all kinds into these environments, and providing professors controls to guide students through their explorations. Common interfaces are needed to save projects, work in groups, share experiences, and submit results. We have the foundation today to create the lifelong learners of tomorrow.