Title

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Project Overview: Creating and evaluating mixed-reality science labs for undergraduate chemistry and biochemistry education.

This is the **main takeaway** from your research to date. It should be **simplified** to one or two sentences.

Lessons Learned & Insights Gained

We recently published our first paper, entitled “Framework For Scalable Content Development In Hands-on Virtual And Mixed Reality Science Labs describing the technical features and preliminary usability data of our mixed-reality science lab system (https://ieeexplore.ieee.org/document/9815945). This paper won the best short paper award at the iLRN conference in 2022. Our second paper, titled “Miniaturization and geometric optimization of SteamVR active optical trackers”, highlighting our work to make cheaper mixed-reality tracking hardware for our efforts, was also recently accept in SPIE AR/VR/MR (http://spie.org/AVR01). We are confident that mixed-reality science labs offer a uniquely enabling path to cost-effectively training the STEM workforce of the future and are grateful to NSF for investing in our project and this general category of approaches for STEM laboratory training and workforce education.

Equity

To make our approach and mixed-reality science lab technologies in general more equitable and affordable, hardware costs must be brought down. We have worked successfully over the past 12 month to further this goal.

New Challenges & Next Steps

Our assessment strategy and agile development model has needed constant iterative evolution to ensure success of our grant objectives and goals. We are now scaling up development and testing of the chemistry and biochemistry modules we’ve developed to address the learning science objectives of our project.

Our efforts are also translating into intellectual property and commercial products that we hope will make our technology and approach available more broadly to educators, industry partners, and the general public.