Educational inequality is a large problem in the United States, and the gap between high and low achieving students has grown over the past years. We want to help reduce this gap in chemistry education. Specifically, we propose to develop a cost-effective titration experiment that does not require an expensive spectrometer. We developed a new colorimetric method that does not require a spectrometer and instead employs computational image analysis. We will transfer this new research know-how into Missouri high school classrooms to improve chemistry education. We will pursue this goal with three specific aims in mind. First, we aim to improve the prototype software with rigorous testing and validation. Second, we will expand the scope of the experiment and test carefully under a variety of conditions, including two different experimental setups and with a variety of pH indicators. This will allow us to optimize the experiment with a high school audience in mind. Third, we will create a set of detailed instruction manuals for each experiment along with complete sample write-ups so as to facilitate its easy adoption and widespread implementation.

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