Terracotta at Indiana University

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Challenge

Good educators have an intuition about what works in their classes; great educators observe how well their strategies work, and innovate accordingly. But, how can teachers measure whether their strategies actually help their students learn? Randomized controlled trials are the best way to gather data about one approach versus another, but they're also time-intensive, cost-prohibitive, and just plain impractical to implement in a classroom. What if we could create studies right in the learning management system (LMS), where so many learning activities already take place?

At Indiana University (IU), we saw a need for research infrastructure that facilitates rigorous, responsible research when and where it matters – in the classroom. In partnership with Unicon, we created Terracotta, a free, open-source LTI tool, to simplify the process of setting up experiments, opening research opportunities to curious teachers who want data from their own classes. Terracotta also opens opportunities for collaborations between teachers and researchers, seeking broader insights about effective learning and instruction. Terracotta adds a full research toolkit right into a Canvas course site and embeds experiments into course assignments, collects student consent with a few clicks, randomly assigns consenting students to different conditions, and provides deidentified data to measure how different versions of an assignment affect student learning. With Canvas positioned as IU's system-wide LMS, Terracotta is well-positioned to help teachers learn what works for their students without disrupting the context of their classrooms.

Learning Impact Outcomes

Terracotta has already supported a handful of research studies at Indiana University, helping teachers and researchers identify instructional practices that improve student outcomes.

- One study looked at how transparency about a learning activity's purpose and grading standards, a practice called TILT, improved student performance in weekly reflection assignments in criminal justice courses.

- Another study, embedded in dozens of classes across multiple IU campuses, examined how ungraded multiple-choice questions at the start of online videos improved student recall of the concepts in the videos.

- And Terracotta recently supported an experiment investigating how generative AI might help students give better feedback to classmates during peer review exercises in composition classes.

These research studies all address potentially beneficial instructional innovations; but we all know that it's better to rely on data than intuition. Terracotta helps us move beyond new and shiny to what works by providing data on our innovations, and measure learning impact in rigorous and responsible ways. When we know what works, beneficial practices are more likely to be adopted, shared, and amplified.

Return on Investment

Terracotta facilitates evidence-based teaching practices by delivering data on our innovations, and measuring learning impact in rigorous and responsible ways. Our teaching should be evidence based, and Terracotta produces that evidence. With a better understanding of what works, beneficial practices are more likely to be adopted, shared, and amplified. But Terracotta doesn't just produce evidence -- we're also changing the culture around evidence-based teaching. In designing Terracotta, we've centered the needs of teachers and created an intuitive, easy-to-use tool that simplifies the research process without creating additional burden for instructors. At IU, Terracotta empowers teachers to be active participants in discovering what works. Terracotta is creating a positive feedback cycle of facilitating research, improving the evidence, and helping teachers become change agents for learning impact.